

DRAFT

**CHOICES FOR
MISSION BAY
Planning Considerations**

**Mission Bay
San Francisco**

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Choices for Mission Bay
: planning
1986.

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1.0 Introduction



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This report identifies the basic determinants that influence the physical form and design character of Mission Bay, outlines a range of land uses to be considered for the site, and presents three alternative design concepts and six alternative land use plans to illustrate the possibilities for shaping development. This work is submitted to the City Planning Commission, to residents of the City and other affected parties. Considered the starting point for planning, the report is intended for public review of the fundamental choices for development and to stimulate public debate over Mission Bay's future.



This report is divided into four chapters. The Introduction and Summary introduces the report and gives its context for the ongoing planning process for Mission Bay. It provides the background for planning and summarizes the other chapters of the report. Plan Determinants identifies the planning factors that will influence the ultimate Mission Bay land use plan. The Land Use Program is then described. The types of land uses appropriate for Mission Bay and the range of acreage that would be realistic for each use given differing priorities is set forth. Design Concepts/Illustrative Plans show alternative ways that the programmed land uses can be arrayed on the

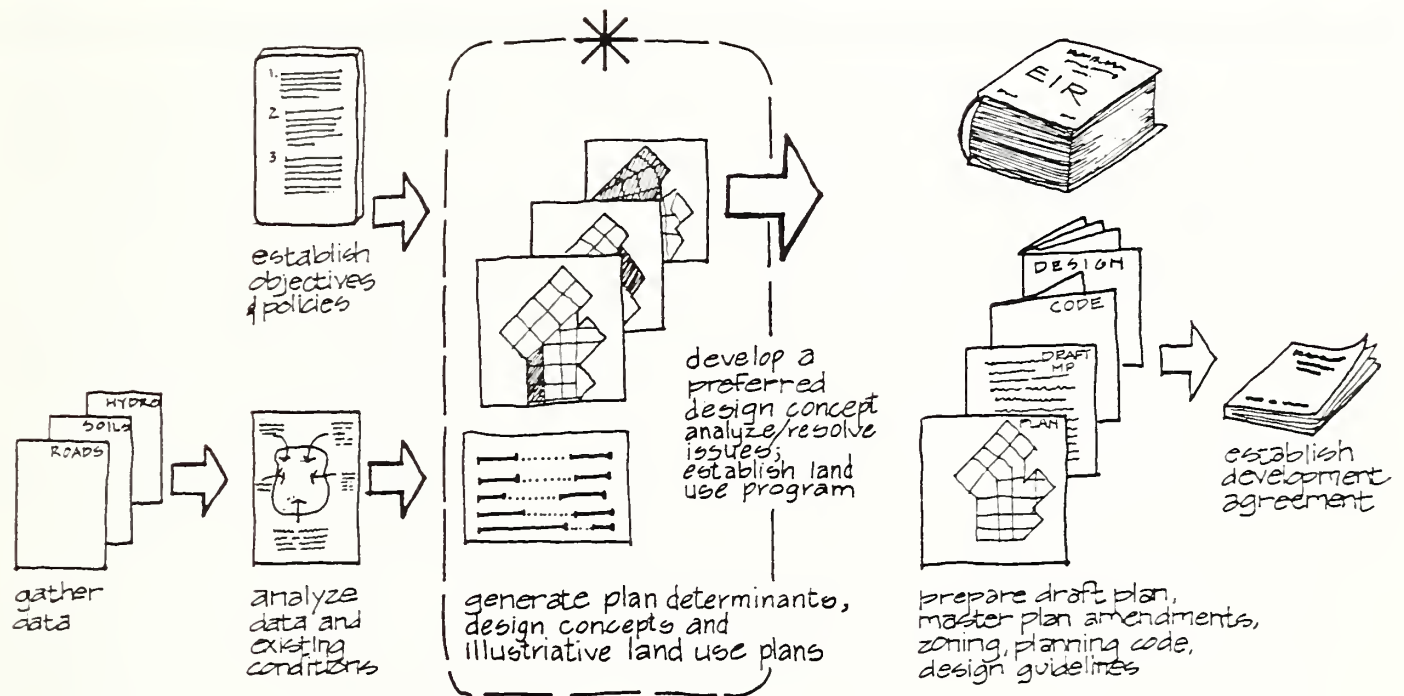
site. They highlight in plan and text forms the various choices that still remain to be made about (1) character of Mission Bay, (2) the optimum amount of each land use, and (3) the best location for each use on the site.

This work follows the publication of two earlier reports, the Background and Preliminary Findings Report, Draft Working Paper, November 8, 1985 and Objectives and Policies, Proposal for Citizen Review, December 30, 1985. In the first report, existing site conditions and environs were identified, along with existing principles and objectives established by the public agencies, community interests, and current opportunities and constraints affecting the site. The second report included objectives and policies intended to act as general guides for planning Mission Bay. While the contents of the earlier reports provide a framework for succeeding work, both will continue to be refined or modified as appropriate, based upon public comment and further analysis.

The design concepts and land use alternatives in this report are prepared to test whether all the identified objectives and policies can be implemented in a physical sense. They represent different land use programs, different overall designs and different combinations of the basic plan determinants identified the report. After extensive discussion and reaction to these alternatives, and additional studies and analyses are completed, a Mission Bay Plan will be drafted by the Department. Clearly, reactions and discussions will strongly guide the Department in plan preparation.

Following public review and comment, the Plan will be presented to the City Planning Commission for its consideration. Required City actions, including the anticipated development agreement, will clarify how mitigation of any impacts is to be achieved. Beyond the City Planning Commission, the matter will be subject to Board of Supervisors action, with any final legislation requiring the Mayor's signature. Following is a diagram showing the several phases of the Mission Bay planning process and the project's current status. The products to be provided during the process are noted.





1.4 INTRODUCTION AND SUMMARY

1.1 The Background for Planning

1.1 The Background for Planning



Cities do not remain static and must adapt to new functions and uses in order to retain their social and economic vitality. Mission Bay itself is an example of how areas within a city experience the effects of urban change and economic trends. But change at Mission Bay also brings a unique opportunity for San Francisco. The City should take full advantage of the circumstances and consider Mission Bay as a resource.

Mission Bay's nearly 300 acres of land and water is relatively undeveloped. There are no other comparably-sized and situated lands within San Francisco. With a site of this size, a neighborhood of new and desirable character can be comprehensively planned. Because virtually all private lands are held by a single project sponsor, a city-adopted plan, which takes into consideration the public goals and private expectations for the area, has excellent prospects for full implementation over time.

The site's close proximity to Downtown suggests opportunities for both commercial activity complementary to the Downtown, and for housing within walking distance or a short transit ride to employment centers. Research and development activity, a light industrial use to be further defined and explored as a new sector of the city's economy, is compatible with neighboring industrial and maritime uses. Comprehensive planning of the area can provide an open space system both serving a new community and making optimum use of the extensive China Basin Channel shoreline. An appropriate mix of revenue-producing uses can be included within the development to help subsidize needed public infrastructure and public benefits desired from the project.

The Department's Mission Bay Study began following the Mayor's letter of October 16, 1984 to the Southern Pacific Land Company, the predecessors in interest of Santa Fe Pacific Realty Corporation, owner of much of the Mission Bay-land. The letter followed months of negotiation between the Mayor's Office, including the Department of City Planning, and Santa Fe Southern Pacific Corporation. The Mayor announced her support for a project that included at least 7,577



1.1 The Background for Planning

residential units, and up to 4.1 million square feet of office space, 2.6 million square feet of research and development space, and 200,000 square feet of retail space; no buildings would be over eight stories, and the land uses, open space, and waterways were to be sited as per the earlier 1984 Southern Pacific site plan.

These negotiations resulted in a project vastly scaled down, yet feasible to the project sponsors. The previous Southern Pacific proposal had been for 7,000 residential units, 11.7 million square feet of office space, 4.3 million square feet of research and development space, 500,000 square feet of retail and hotel space, and building heights up to 42 stories.

The program contained in the Mayor's letter represents a balance between residential and commercial development. This would meet a broad range of city goals and ensure that revenue from the project is available to help subsidize infrastructure, community services, open space and affordable housing requirements on the site. A maximum housing program would place more emphasis on having to maximize opportunities to meet the city's housing goals. Alternatively, a predominantly commercial or maritime alternative could meet more economic development and jobs goals.

The range of land uses discussed in this report has not been evaluated from the standpoint of economics. The City is neither in a position nor does it intend to determine what makes the project profitable for Santa Fe Pacific Realty Corporation. However, economic information will be developed in order to evaluate planning decisions and guide negotiations of a development agreement with the project sponsor. Economic information, plus a method of evaluation, is now in preparation and will be available for consideration in future phases of this work.

The Department and its Mission Bay planning team have not assumed that the site plan is fixed by any previous efforts at planning Mission Bay. Public concerns expressed about prior plan configurations, as well as the Department's technical concerns over earlier plans, suggested a fresh start for the land use plan. The 1984 Southern Pacific plan, and other plan



I-6 INTRODUCTION AND SUMMARY

I.1 The Background for Planning

concepts by the Mission Creek Conservancy, San Francisco Tomorrow, and Potrero League of Active Neighbors, have all been considered by the Department in preparing the design concepts and land use alternatives of this report.

In addition to these matters, the site constraints discussed in the Background and Preliminary Findings Report should be noted. The soils underlying the site influence development substantially, as it is virtually all fill of the former Mission Bay and its marshes. As such, it is poor quality in general, which adds to construction costs and seismic concerns. Traffic around the site, on the I-280 Freeway and Third Street, makes some locations less desirable for housing. Further, as the I-280 Freeway ramps are taken down within the northern part of the site, there will be more traffic on surface streets through the development. The utilities infrastructure in place at the site is not enough to serve the development, yet is sufficiently in place to add considerably to costs if certain segments of it are proposed for relocation. This includes the large sewage retention boxes under Channel and Berry Streets, and the large sewer pipes under Sixth and Owens Streets. These and other physical constraints are discussed in the earlier report.



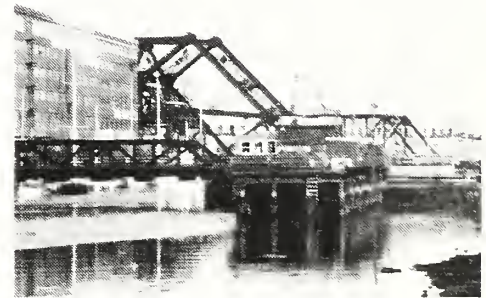
I.2 Plan Determinants
Summary

I.2 Plan Determinants Summary

The Plan Determinants chapter presents important decisions to be made in Mission Bay planning. Plan determinants are those planning factors that influence the configuration and allocation of land uses on the site. Each factor also influences the land use program to some extent. This report identifies and describes determinants considered key to any plan the City may ultimately propose for this site. They illuminate the fundamental choices in developing a Mission Bay Plan. The illustrative land use plans included in this report display combinations of these determinants that appear both feasible and desirable in the context of overall design concepts for the site.

The determinants include:

- o Open space systems
- o Street grids
- o Street arterials on the north, west and east
- o Rail transportation
- o I-280 Freeway ramps
- o Port activities east of Third Street
- o Wetlands
- o Housing
- o Retail uses
- o Secondary office
- o Research and development
- o Community and cultural facilities



These determinants and the choices under consideration are listed below.

- I. Open Space Systems--Creating parks and open space corridors, taking advantage of the Channel and Bay
 - o Connect China Basin Channel at its midpoint (Fifth Street) to a formal canal and/or open space corridor running south through the middle of the site, then to the Bay;

1-8 INTRODUCTION AND SUMMARY

1.2 Plan Determinants Summary



- o Connect Channel at its western end to a crescent-shaped canal and/or open space corridor reflecting the historic shoreline of Mission Bay as it circles around the site to the Bay;
 - o Link Channel with a central park near Fifth Street, with open space and/or a canal meandering through the site to the Bay; and
 - o Integrate water quality considerations.
2. Street Grids--Establishing the street pattern south of the Channel
- o Extend the South of Market grid south of the Channel, keeping present Sixth Street but perhaps shifting Third Street toward the Bay where it would loop around the site;
 - o Extend the Third Street north-south grid to the Channel; and
 - o Create a mixed grid by extending South of Market grid along Sixth Street, and the Third Street grid along the east side of the site, resolving conflicts in these grids at the interior of the site.
3. North of Channel Arterials--Accommodating heavy traffic and transit
- o Townsend Street could be two-way or part of a one-way couplet, with or without Muni-Metro and an underground Caltrain;
 - o King Street could be a major two-way boulevard or part of a one-way couplet, with or without Muni-Metro and an underground Caltrain; and
 - o Berry Street could be a local access street, or part of a one-way couplet with or without Muni-Metro.

I.2 Plan Determinants
Summary

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4. West Side Arterials--Connections between south of the Channel and the north
 - o Owens Street, right across the railroad tracks from Seventh Street, could run between the western edge of the site and a Caltrain station, relocated under the Freeway; and
 - o Sixth Street could include Muni-Metro.
 5. East Side Arterials--A possible shift for Third Street
 - o Keeping Third Street in its present alignment maintains the division of the site into east or west of Third Street; and
 - o Realigning Third Street along China Basin Street at the Bay edge unites the site, but puts an arterial along the Bay.
 6. Rail Transportation--Caltrain commuter, Muni-Metro users, and freight
 - o Caltrans would like to extend the Caltrain to an underground station downtown if financing becomes available; the present station could be moved to Seventh at Channel or Sixteenth Street, as a temporary or permanent station, with a right-of-way to either Townsend or King Streets for potential undergrounding later;
 - o The Caltrain station could be under either Townsend or King Street, at either Fourth, Fifth or Second Streets, or under the block at Townsend, King, and Fourth Streets, to be a way station if undergrounding to downtown were later achieved;
 - o The Muni-Metro/E Line Streetcar could be extended on Townsend or King Streets; in the median strip or on one side of the street;

I-10 INTRODUCTION AND SUMMARY

I.2 Plan Determinants Summary

- o The Muni-Metro should cross the Channel at Owens or Sixth Street to serve the southern area, as the Third and Fourth Street Bridges have insufficient capacity to provide a separate transit right-of-way;
- o The E Line should continue to Showplace Square, and the Muni-Metro down Owens or Sixth Street to Sixteenth Street;
- o The San Francisco Belt Railroad freight service serves the waterfront north of the Channel, and could be connected either via Townsend or King Streets, or via the Third Street Bridge with connections to Illinois or China Basin Streets; and
- o The Central Waterfront freight connection from the rail mainline must come through the site from Seventh Street until either the Port constructs a planned drawbridge over Islais Creek or other options are found which enable a connection along Illinois Street.

7. I-280 Freeway Ramps--removing and rebuilding ramps

- o The I-280 Transfer Concept Program keeps the two Sixth and Brannan Street ramps (which block Sixth Street) and connects two new ramps toward The Embarcadero on King and Berry Streets between Fifth and Sixth Streets;
- o A revised four-ramp system moves the Sixth Street ramps to unblock the street, shifting one to Seventh Street, and brings the two ramps for The Embarcadero down between Sixth and Seventh Streets; and
- o A two-ramp system sets one ramp down on Sixth Street, the other on Seventh, and does not direct--but does allow--traffic flow toward The Embarcadero.



1.2 Plan Determinants
Summary

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8. Port Activities East of Third Street--Existing maritime uses, potential Container Terminal
- o Present activity level could require some buffering; and
 - o A Container Terminal would use all land east of Third Street, following condemnation or other efforts to acquire privately-held land, and preclude housing immediately west of Third Street.
9. Wetlands--A salt marsh habitat
- o Beneath and east of the I-280 overpass at southwest end of Channel;
 - o Northwest side of Channel along Berry Street;
 - o Southeast side of Channel west of Fourth Street;
 - o Between Third and Fourth Streets; and
 - o Mouth of Channel near Pier 48.
10. Housing--A new San Francisco neighborhood
- o Relatively high density housing, to maximize housing contribution;
 - o Housing above neighborhood retail space;
 - o Family housing;
 - o Neighborhood open space;
 - o Housing at the perimeter of blocks, with continuous street frontages and multiple street entryways;
 - o Diverse housing types to serve a diverse community;



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1.2 Plan Determinants Summary

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- o Low-rise housing at about Nob Hill densities, about 80 units/acre, with three stories over wood-frame shared parking garages or four stories over concrete parking garages;
 - o Mid-rise housing at about 120 units/acre, combining eight-story housing with low-rise housing over concrete, pile supported garage; higher density (about 150 units/acre) if all mid-rise;
 - o Densities can be increased by incorporating alleys within blocks to increase street frontages;
 - o Sample housing types are illustrated; and
 - o Houseboat/boat community locations are discussed.

11. Retail--Serving both employees and residents, helping to define the neighborhood



- o Retail north of the Channel adds interest and value to both employment areas and Channel edge;
- o Retail south of the Channel can be the neighborhood shopping street;
- o Retail along a public square or other open space can be a focus for neighborhood shopping and add interest and vitality to open spaces; and
- o Retail along an arterial street can buffer adjoining housing from traffic.

12. Secondary Office--A revenue producer keeping entry-level jobs in the City

- o Predominantly eight-story buildings with large floors, with opportunities for ground level retail;

I.2 Plan Determinants
Summary

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- o Accessible by public transit, and accessible from Downtown and from Mission Bay residential areas; and
 - o Sizable open spaces could be integrated into office areas.
13. Research and Development (R&D)--The Bay Area's growth industry
- o Two- to four-story buildings, with high ceilings on first floors;
 - o Accessible by public transit, and from Mission Bay residential; areas served by I-280 Freeway;
 - o Sizable open spaces could be integrated into R&D areas; and
 - o Alternative R&D uses include large-scale retail, wholesale, light industrial, maritime, and light manufacturing and warehousing.
14. Community Facilities--Serving the Mission Bay community
- o Community facilities can be located between different land uses, at public squares, on commercial streets, and at parks; and
 - o Facilities to be considered include fire, police, school, health, mass care, child care, cultural arts, church, library, community center and recreational.



I-14 INTRODUCTION AND SUMMARY

I.3 Land Use Program Summary

I.3 Land Use Program Summary

The land use program shows the mix of uses, and the amounts of uses that could be located within Mission Bay. Four alternative land use programs are presented: (1) a balanced mixed use program; (2) a maximum housing program; (3) a predominantly employment program; and (4) a container terminal program. A proposed program will be developed as planning continues, as additional studies are undertaken, as economic information is developed, as citizen and public agency comments are gathered and considered, and as discussions with the project sponsor continue.

The program alternatives are derived in part from the Department's assessment of San Francisco's future needs, and constraints previously discussed, the Objectives and Policies and input provided by the community and the project sponsor. The programs reflect fundamental planning principles, market and site conditions, and public concerns.



A balanced mixed use community can produce a net addition to San Francisco's housing stock, while establishing an advantageous position for the city to foster its job base and diversify its economy. A variety of uses can be marketed and absorbed faster than any single land use, and thus provide cash flow for infrastructure costs, community services, affordable housing and an open space system that enhances the development and adds to the City's shoreline recreational opportunities. Alternatively, a predominantly residential community would go further in meeting the City's need for housing. More units would be created, and fewer units would be required to serve new Mission Bay employees. A predominantly commercial development could serve City employment and economic diversification needs, and perhaps fund more amenities within the development. A container terminal reservation would enable land banking of those portions of the site east of Third Street until such time as the Port determined to proceed with development of a container terminal. The Mission Bay land use program ranges under consideration are indicated on the next page:

1.3 Land Use Program
Summary

Table 1: Mission Bay Land Use Program Range

<u>Use</u>	<u>Acres</u>
Housing	88 - 126 acres (6,350 - 10,240 dwelling units)
Public Open Space*	72 - 99 acres
Office	10 - 45 acres (1.7 - 5.7 million square feet)
R&D	12.8 - 38 acres 975,700 - 2.8 million square feet)
Retail	7.2 - 16 acres (157,000 - 336,000 square feet)
Maritime	0 - 45 acres
Hotel	3.5 - 4 acres
Community Facilities	1.2 - 3 acres
Infrastructure and Unusable Land	62 - 69 acres
TOTALS	176 - 372 acres

* Includes public open space within housing, office and R&D acreage.

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I.4 Design Concepts and Illustrative Plans Summary

I.4 Design Concepts and Illustrative Plans Summary

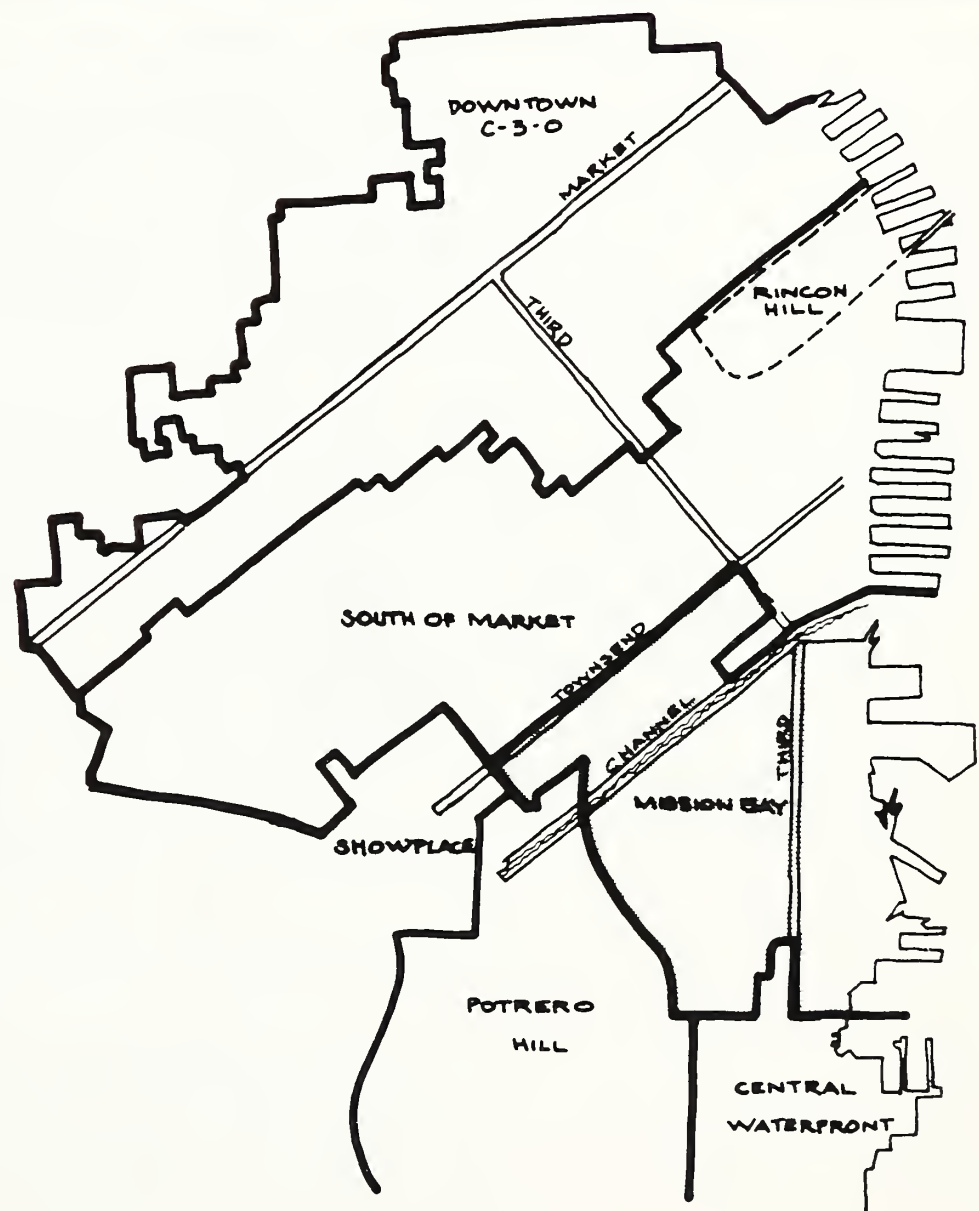
Three design concepts and six associated illustrative land use plans are included in this report to show how land uses can be arrayed on the Mission Bay site. These concepts and illustrative plans follow from the Objectives and Policies and represent choices among overall site design concepts and the plan determinants, including land uses within the program range. From these alternatives or some variation that may emerge during the course of public discussion and agency review, the Department expects to produce a plan for Mission Bay.

The alternative plans demonstrate the suitability of different portions of the site for different types of development. The alternatives, as can be seen in the report, have varying land use accounts. They show how different development patterns can vary the land use program for the site. They also show how the land use account for each alternative can be changed to reflect different priorities among uses. Thus, the land use programs within each alternative should not be considered fixed but as points for discussion and further evaluation.

It is important to focus on the design concept behind each of these illustrative plans. The design if implemented will become a permanent part of the San Francisco pattern that will endure as uses change and the land accommodates differing space needs. The challenge is to achieve a worthy and therefore outstanding design, with a mix of land uses that both benefits San Francisco and can be implemented by the project sponsor.

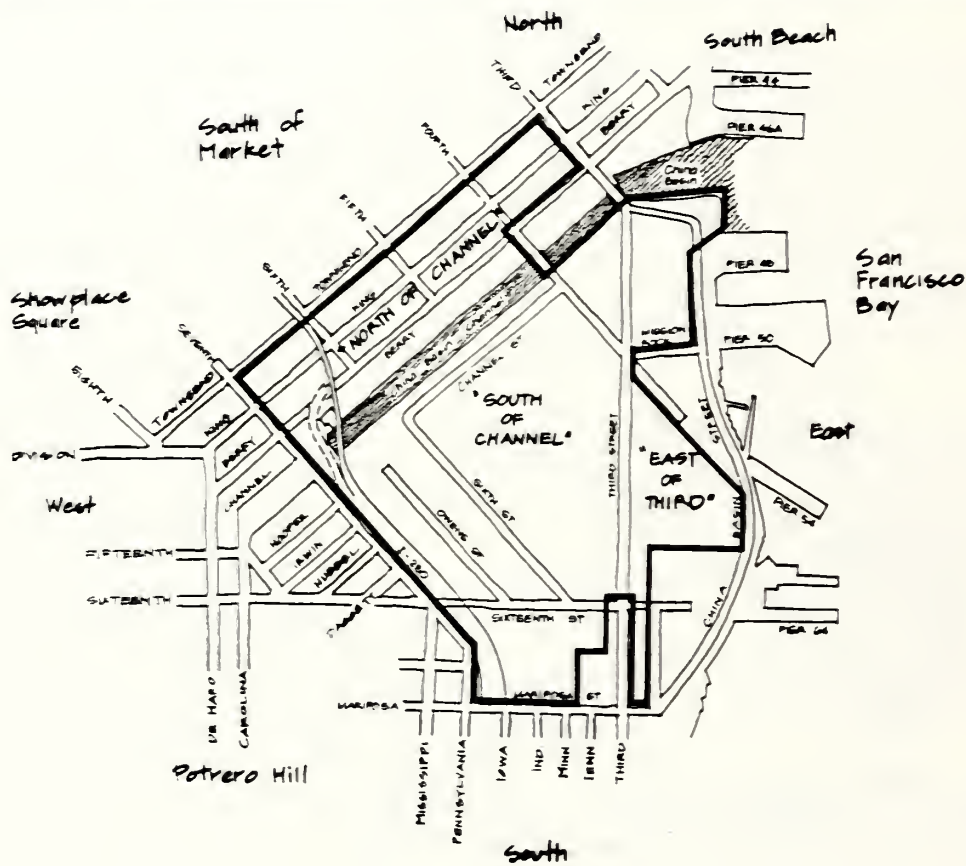
The design concepts, with open space networks and selected options, are presented on the following pages. Each plan can and should be evaluated to determine (1) how well the Objectives and Policies are met; (2) the ability of each plan to meet land use program goals (3) the effectiveness of implementing various plan determinants and (4) the extent to which each design concept can achieve the vitality that will be a benefit to all San Francisco.

I.4 Design Concepts and
Illustrative Plans
Summary



1-18 INTRODUCTION AND SUMMARY

1.4 Design Concepts and Illustrative Plans Summary



Ball Park Proposal

**NEW GIANTS BALL PARK PROPOSAL FOR SEVENTH AND
TOWNSEND STREETS**

As this report was being prepared for printing, the Mayor announced an agreement with Santa Fe Pacific Realty Corporation and her recommendation for a 42,000 seat ball park at Seventh and Townsend Streets. This fifteen acre site was amongst those considered in the 1983 Stadium Feasibility Analysis--a Study of Alternatives. Construction costs are anticipated to be borne partly by revenue bonds, which would make the stadium the likely subject of a November 1986 proposition.

This proposed stadium site is within the 300-acre Mission Bay Planning area. The Mayor has amended her October 16, 1984 letter setting forth the broad outline of development she would support within Mission Bay. Final approval of the entire development continues to rest with the City Planning Commission and Board of Supervisors. Amendments to the Mayor's letter include:

1. Relocating Santa Fe Pacific research and development space from Seventh and Townsend to elsewhere on the site, at higher densities;
2. Providing a five story, 500-room hotel near Third and Fourth Streets at the Channel;
3. Adding 124 dwelling units, for a project total of at least 7,701 residential units;
4. Assuring a right-of-way for the Caltrain to be provided by Santa Fe Pacific through Mission Bay to enable a downtown expansion, and relocation of the Fourth and Townsend Caltrain station to Seventh and Channel; and
5. Using Santa Fe Pacific land east of the ball park site for interim parking, with eventual use of 5,500 garage parking stalls associated with Mission Bay commercial development.

Ball Park Proposal

Clearly the proposal for a ball park at the Seventh and Townsend corner of Mission Bay will be a major factor in future planning for the project's overall development. The Seventh and Townsend corner is somewhat isolated from the rest of the project by the I-280 Freeway and the Channel Pump Station and Outfall. It is a discrete parcel for which planning to date has considered a variety of commercial uses including research and development, wholesale/showroom; offices and large-scale retail. However, among other factors, the ball park's transportation impacts must be carefully considered.

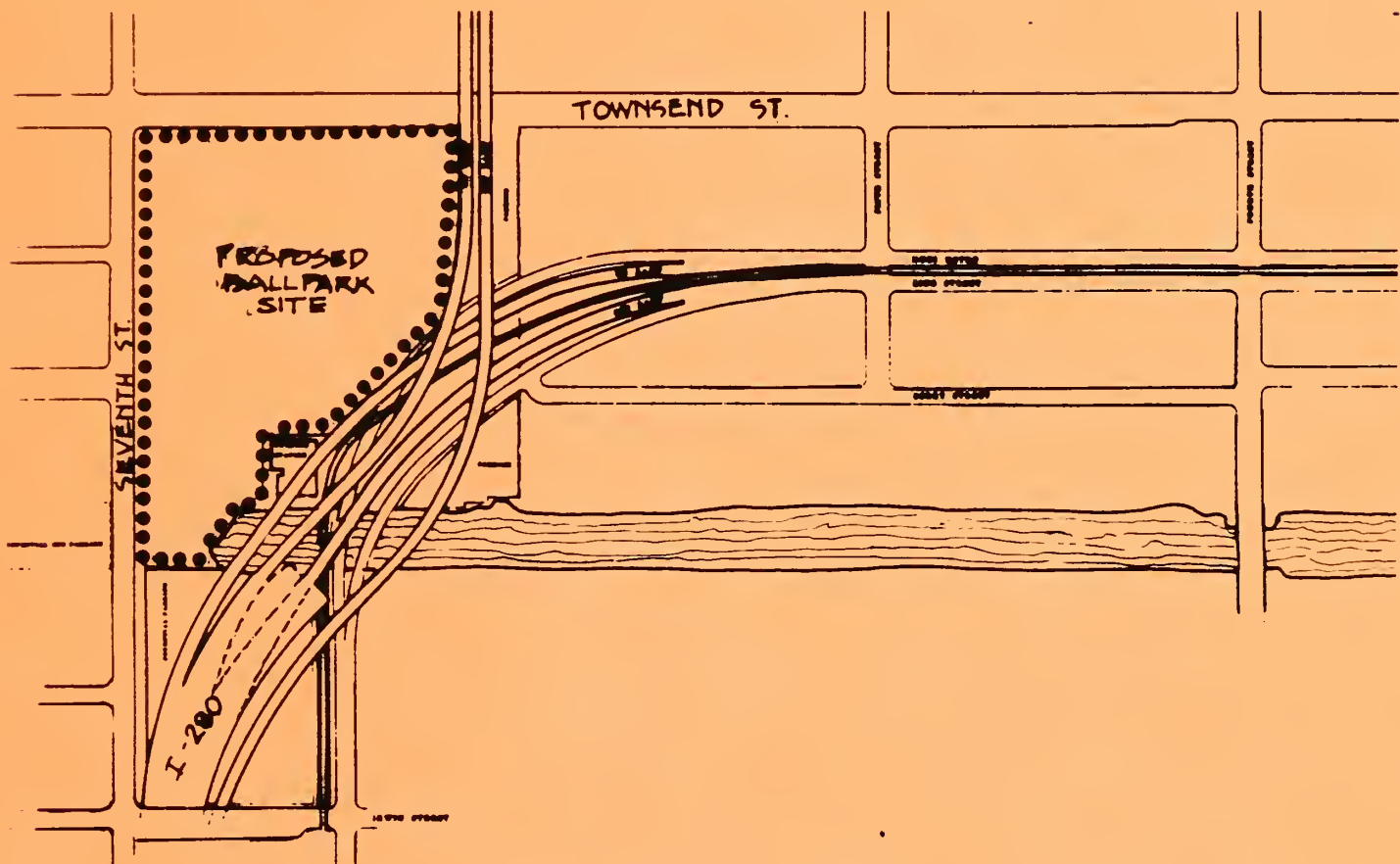
In reviewing this report it will be useful to consider some of the immediate implications of a ball park for the development of Mission Bay. The hotel and additional housing, and Caltrain relocation, are already discussed as options in the Choices report. Among other modifications for consideration:

1. The ball park at Seventh and Townsend Streets would block off or cause rerouting of King and Owens Streets around its site.
2. A new "H" streetcar line, proposed to run from Market Street down 11th and Division Streets to the relocated Caltrain Station, would provide additional transit service to the site.
3. The options for freeway ramp reconstruction would be narrowed. Construction of ramps to circumvent the ballpark requires using a portion of the easterly block bounded by Sixth, King, Fifth and Berry Streets.
4. The ballpark's noise, lighting and crowds could affect nearby portions of Mission Bay.
5. Research and development densities on specific sites (although not total site square footage) may be increased.

Developing a financing plan and design for the ballpark itself will proceed independent from Mission Bay. Such factors as parking requirements, effects on neighboring areas, lighting, noise, crowd control, other environmental considerations and other environmental considerations and scheduling of events

Ball Park Proposal

must be addressed by the ball park's planning team. The availability of information must be timely and coordinated carefully with Mission Bay work. The responsibility of the Department of City Planning is to integrate consideration of a ball park and the information developed for that concept in planning for the overall Mission Bay development.



2.0 Plan Determinants

2.1 Open Space Systems

Review of existing information and experimentation with various overall design concepts for site development has led to the identification of the planning factors that will determine the shape and form of the Mission Bay Plan. This section itemizes each factor, or "plan determinant," and explains what the choices are for solving each issue. No recommendations are made because the different solutions have to be tailored to work with the to-be-selected overall design concept for the site (see Section 4). Nonetheless, a thorough explanation of the considerations to be made when choosing various plan determinant solutions is presented.

The open space system and street grid determinants affect all areas of the site and are presented first because they provide a means for organizing all land uses on the site. Other plan determinants, affecting only a part or parts of the site, follow. Near the end of the section are subsections about types of land uses, providing generic siting criteria and discussing how they could be applied to this site. Background planning factors such as existing soils conditions or the utility infrastructure are not discussed herein because the extent to which they influence site planning was described in the Background and Preliminary Findings Report (November 1985). They are however referred to when they are believed to affect the feasibility or desirability of solutions offered in this report.

2.1 Open Space Systems

2.1.1 Open Space Planning Criteria

The quality of an open space system contributes directly to the quality of life in the urban environment. This is particularly true in residential neighborhoods. The open space system is a strong determinant of the image and character of the community.

Open space systems need to meet specific program requirements within a development as well as be diverse in all those qualities that can seldom be defined in a program. To meet these quantitative and qualitative requirements, an open space should consist of a variety of components, differing in

2-2 PLAN DETERMINANTS

2.1 Open Space Systems

Systems configuration scale, character and purpose. Clearly there are trade-offs between the amounts of land devoted to each component. The following is a brief description of some of the special open space components under consideration, their possible treatment in Mission Bay and their relationship with other plan components.

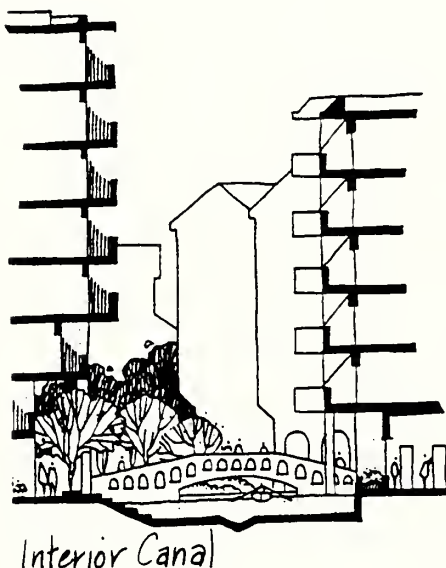
o Marsh Wetlands Habitat

A salt marsh would be passive open space providing people a retreat from urban pressures and offering exposure to the natural environment that once characterized Mission Bay and survives there now in a limited form. It could provide wildlife a habitat for feeding, resting and nesting.

Descriptions of and site analyses for tidal marsh habitats will be discussed specifically in other parts of this section, however, some planning criteria should be noted. To protect wildlife from human and development impacts, a location closer to San Francisco Bay and less impacted by buildings and human activity is preferred. A major component of the wildlife habitat is open water, suggesting that a position adjacent to China Basin Channel or San Francisco Bay would be advantageous. Otherwise, greater land area for habitat development would be necessary. A buffer space around the marsh habitat is necessary to diminish the effects of human intrusion. Islands as well as water-filled barrier channels can protect the bird community from predators. Marsh habitats are compatible with unstructured park space. When adjacent to structured recreational areas or play fields, a berm, hedge or tree mass can provide the necessary protection while consuming little space.

o Interior Watercourses/Canals

A watercourse within the Mission Bay community can provide an important design element. It could be tidal-driven between San Francisco Bay and China Basin Channel, subject to the full range of tide level changes. Alternatively, it could be a controlled system utilizing



2.1 Open Space Systems

water from San Francisco Bay which is directed through the site to the Channel. Because space is limited, a controlled method appears most suitable. It would allow for controlled water depths and velocities, direction of flow and configuration of channel. It could be delivered by pipe or by surface or elevated channel, culminating in a dramatic waterfall feature at the Channel.

Both a canal and China Basin Channel could have hard or soft edges, depending upon the design character sought. This is independent of whether the canal is tidal or fixed-level. A planted, natural appearance is possible with a structurally-hard system, as plantings can be an intrinsic part, giving a soft look. Conversely, in a soft-edged system, with no retaining walls, amenities of a hard-edged nature can be incorporated to sharply define the contrast between the water and the urban environment. A hard edge can incorporate steps, walkways, docks, seating, look-outs and curved forms to provide a variety of interaction with the water.

o Recreational Open Space

While passive open space gives image, character and counterbalance to urban development, the Mission Bay community will also need active recreational open space--both structured and unstructured. Unstructured open space is basically any available shape and size where running, jogging, picnicking, frisbee, etc., can occur. Its flexible space requirements make it easy to integrate within the built environment. In Mission Bay, unstructured open space is a particularly suitable use for areas in which differing street patterns confront one another or where irregular shapes are formed between street grids and other man-made features. Soft or hard edges could be employed if next to water.

Structured open space must accommodate soccer fields, baseball diamonds, basketball and tennis courts, etc., which have specific dimensions and often large area requirements. The Open Space concepts or alternates in Section 4 indicate an area of play fields. If a school were



2-4 PLAN DETERMINANTS

2.1 Open Space Systems

provided (see 2.1.4.4), its play fields and courts could be used by the community. Additionally, some potential exists for development of roof areas above R&D uses as basketball and tennis courts. The Department is currently evaluating needs for structured recreational open space uses.

In evaluating various open space systems, planning criteria are necessary to test the approaches. These criteria can be summarized as follows:

- o An open space system should give identity, quality, image and organization to the project, and be a major focal point for project orientation.
- o It should be a hierarchical network or system with a variety of scales of spaces whose order is implicit in its visual form. As many land uses as possible should front on open space, and it should be visually and physically accessible from streets.
- o The open space system must assist in giving the development its overall image, tone and texture.
- o The system should visually and physically connect to major adjacent man-made and natural features (such as San Francisco Bay, China Basin Channel, Potrero Hill, the Downtown, South of Market, Showplace Square, and the Bay Bridge).
- o Major open space features should be physically framed and supported by the architecture and adjacent land uses, and vice versa.
- o It should reflect both historical and current cultural patterns and traditions.
- o Open space should serve a variety of roles, for active and passive recreation, enjoyment and use.
- o Pedestrian systems should be tied together through open space, separate from the vehicular circulation networks.

2.1 Open Space Systems

Following are the major options being examined for an open space system.

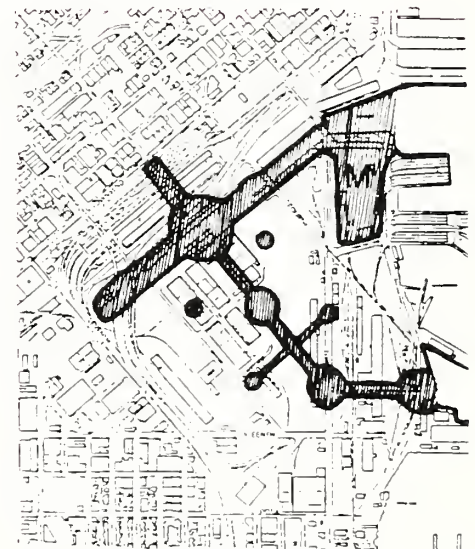
2.1.2 Channel and Central Spine

This system takes advantage of the existing China Basin Channel and a central open space spine to form a major formal configuration. Its alignment reinforces the South of Market grid pattern and produces a visual corridor between south of Market and this site along Fifth Street. It could include a canal as the primary visual element within the open space spine, forming a symbolic water link between the Channel and the Bay south of Pier 54. The housing blocks are further punctuated by four geometric green spaces which add park space residents can expect to encounter at regular intervals. They are within the heart of the neighborhood. This open space system would rely on tree-lined streets and wide sidewalks to create connections with Potrero Hill and additional connections to the Bay, Downtown and The Embarcadero.

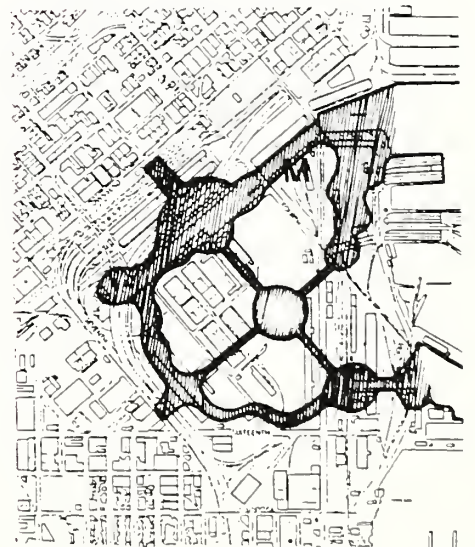
The open space creates water and green space links to the Bay at both the north and south ends of the project. Also, the open space configuration and amenities are the main orienting features of the development. However, its centrality means that this open space amenity would be somewhat remote from housing at the edge of the Mission Bay neighborhood. It would permit development of one of the most efficient plan forms for maximizing the use of land for housing. Although similar to the pattern of square neighborhood parks found elsewhere in the City, the open space form is not reflective of Mission Bay historical patterns.

2.1.3 Channel and Bay Crescent

The strength of this concept is the shaping, orientation and equal distribution of open space throughout the site. This open space form responds to the configuration of the original Mission Bay. The open space form can be strengthened with a canal system connecting the west end of the China Basin Channel with the Bay south of Pier 54. A central formal urban space which could be linked to the crescent by a cross of



Channel & Spine



Channel & Crescent

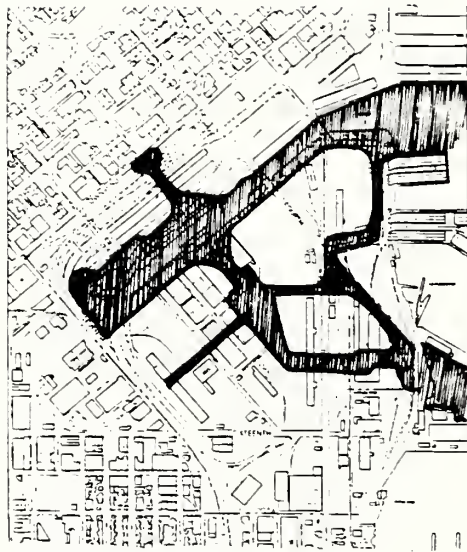
2-6 PLAN DETERMINANTS

2.1 Open Space Systems

pedestrian corridors could unite the development via one pedestrian network. A marsh habitat at the mouth of the channel could strongly connect with the through-site pedestrian corridors.

This open space pattern would provide a long linear edge for development frontage. Historic and present Bay patterns are strongly reflected in the scheme. The crescent extends close to Potrero Hill and Showplace Square and has the ability to accommodate a variety of building shapes and neighborhood connections. It therefore establishes a network within the development's neighborhood and ways of connecting to adjacent neighborhoods. The crescent shapes the Mission Bay neighborhood and has strong pedestrian connections and orientation to the Bay. Land use utilization may not be as high as in a more formal approach.

2.1.4 Channel and Central Park



Channel & Park

This configuration would create a major open space amenity at the center and south of the existing China Basin Channel, and would take maximum advantage of the space created by the Channel. A pedestrian open space spine weaves its way from the Channel to its southern junction with the Bay south of Pier 54. If a street grid were built off Third Street and off Sixth or Owen Streets, this open space system could be planned to resolve the intersection of those grids in the middle of the site. It also would acknowledge the need to retain Third and Sixth/Owens Street corridors. This central space would become the focus of views throughout the site. This spine could be dramatized by a central waterway, linking the Channel with the Bay. Additional pedestrian ways stemming from the main central space could provide additional links to the waterfront and further integrate the system. This could provide an extended natural setting for the houseboat community.

This scheme could act as a seam between two new Mission Bay neighborhoods and could good use of the Channel and central park as orienting elements. A unique San Francisco neighborhood could be developed around such a large informal open space. On the other hand, the central park takes a great

2.1 Open Space Systems

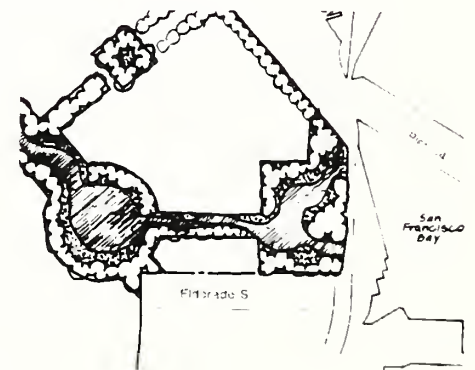
amount of potentially developable housing area. Connections to Potrero Hill and adjacent neighborhoods would be made by providing boulevard (tree-lined) streets.

2.1.5 Channel Water Quality and Circulation

The existing China Basin Channel has serious problems with water quality. These are due to the discharge of raw sanitary sewage into the Channel during storms, and to the inherently poor circulation at the closed end of dead-end tidal sloughs. These problems can cause unpleasant odors and an unattractive appearance to the water west of Fourth Street. This condition has gotten better as Cleanwater Program improvements have occurred, but about ten overflows each year are still expected.

An improved and/or enlarged canal system through the site can be used to improve the circulation in the China Basin Channel and thereby improve Channel water quality. There are several possible configurations:

- o A dead-end Channel. This corresponds to the existing Channel configuration. It would have the disadvantage of having the same poor circulation and water quality problems as the present channel.
- o A main canal through the site with a connection to the Bay south of Pier 54. A new canal would connect the Bay with the western end of the China Basin Channel. This would form a loop or central canal. The closer the loop or canal gets to the west end of the Channel, the greater the potential for circulation patterns which could flush out the Channel. If tidal action were allowed in this canal, a system of flap gates could be used to drive the circulation in the canal in one direction to obtain a net loop circulation. As an alternative, tidal action could be controlled and a pumping system could be used to keep Bay water moving in one direction through the loop. This configuration would improve Channel circulation and provide an attractive open space element. However, it poses the difficulty of routing a new canal through existing utility and sewage structures, and possible problems with adjacent foundations. Adequate flow



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2.1 Open Space Systems

through the canal to prevent buildup of sediment would be necessary.

- o A dead-end Channel with an artificial pumping system. A pumping system could be built to force Bay water through a pipe to the end of the China Basin Channel. This would improve water quality in the closed end of the channel and avoid construction difficulties associated with an extra canal. An attractive additional canal through the open space system would not be required.

2.2 Street Grids

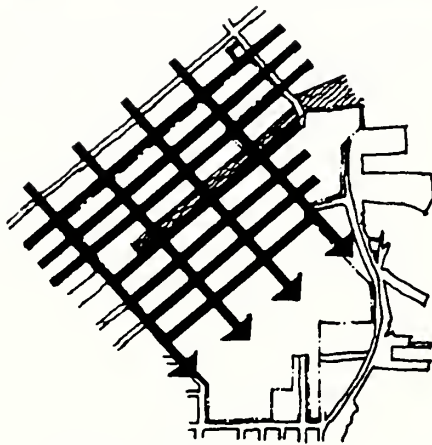
2.2 Street Grids

In the same way that open space systems serve functional and aesthetic purposes in a plan, a street system helps to organize and give character to that plan. A map of medieval, curvilinear roads presents a significantly different urban design solution than a grid of broad equidistant boulevards. Thus, some planning criteria help to determine the most appropriate street grid for a site. The criteria for evaluating Mission Bay street systems stem from the Objectives and Policies and some fundamental land use planning principles. A street system should:

- o Define the scale and pattern of development;
- o Organize and connect various land uses; provide continuity with surrounding street systems;
- o Provide understandable links between project land uses, especially to and from public destinations;
- o Provide access to public open space;
- o Provide orientation for residents and visitors, especially for pedestrians, drivers of vehicles, and cyclists;
- o Provide visual corridor links with surrounding built or natural areas;
- o Functionally and efficiently link uses internal to the site and link the site with adjoining neighborhoods; and
- o Minimize hazards for travelers.

There is no complete street system on the site at present. It is anticipated that the South of Market grid would be retained north of the China Basin Channel. Similarly, Sixteenth and Mariposa Streets would be retained. This section covers the streets between the Channel and Sixteenth Street.

2.2 Street Grids



South of Market Grid

2.2.1 South of Market Grid

This grid orientation would extend the South of Market street system below the China Basin Channel as far as Sixteenth Street. Thus, development on both sides of the Channel would have the same orientation. The existing Fourth, Sixth and Owens Street right-of-ways can be utilized, but Third Street south of the Channel is in conflict with the overall grid pattern because it has a north-south orientation that meets the South of Market grid at angles.

This grid would allow strong vehicular and visual corridor connections to the existing fabric to the north. It could provide street corridor views of Nob Hill, the Bay towards the Bay Bridge, and the working drydocks to the south. Mission Bay south of the Channel would be linked directly and visually with major civic facilities (Moscone Center) in South of Market.

It would match the street pattern immediately to the west, where the South of Market grid continues to Sixteenth Street. The I-280 Freeway and Caltrain tracks prevent a connection, however. Utility lines in Sixth and Owens Street could be retained. It could produce a large number of regular housing blocks which would help achieve the maximum number of housing units. The effect of the strong visual corridors into South of Market and the regular block pattern would be to produce a neighborhood with multiple repeated block shapes rather than a development where many blocks are unique shapes or sizes.

On the other hand, this grid is not compatible with the existing Third Street alignment. Third Street traffic would have to be moved east on Third or Fourth Street toward or onto China Basin Street south of the Channel. The Third Street right-of-way including several existing utility lines would have to be abandoned in the between Fourth and Sixteenth Streets. There could be hazardous intersections creating traffic operations problems along Third Street where streets meet at non-perpendicular angles. Lastly, this grid does not facilitate connections with Showplace Square and limits Bay views along streets to the southeast views.

2.2 Street Grids

2.2.2 Third Street Grid

This grid is compatible with Sixteenth, Mariposa and Third Streets and has the same north-south, east-west orientation as streets on nearby Potrero Hill. The presence of Sixteenth and Third Streets is the basis for implementing this grid in Mission Bay. Both streets serve as entryways to the site with the Third Street connection to South of Market and the Sixteenth Street connection into Potrero Hill. The Channel, Seventh, Sixth, and Fourth Streets would be at an approximately 45 degree angle to this grid.

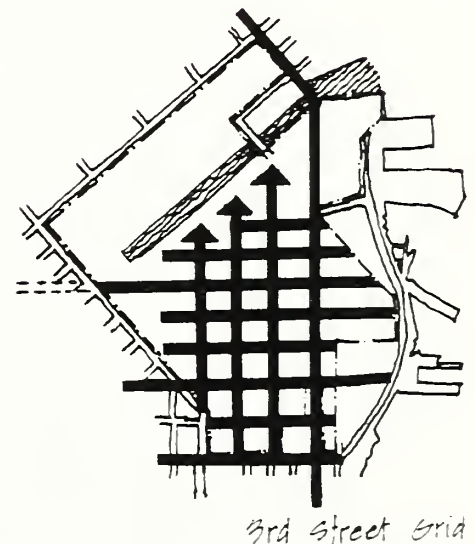
This grid reinforces connection to the street grid south of Sixteenth Street. It also would provide opportunities for direct vehicular and/or visual corridor connections to the south, and to Showplace Square along an extension of Division Street. Third Street could continue to serve as the main arterial through the project area without modification. This grid orientation also would provide street corridor views of Downtown and east to the Bay.

The grid would produce odd configurations next to the Channel, and along the western site boundary, resulting in irregular blocks. This is both an opportunity and a problem. A less rectilinear open space edge can be created along the Channel and western open space. Conversely, irregular development parcels makes phasing of coherent development less easy. Also, where this grid intersects Sixth or Owens Streets, irregular, potentially hazardous intersections would be created.

Although this grid is oriented the same way as the Potrero Hill grid system, the Potrero Hill Streets do not reach the site. Few Mission Bay visual corridors would extend into surrounding areas.

2.2.3 Mixed Grids

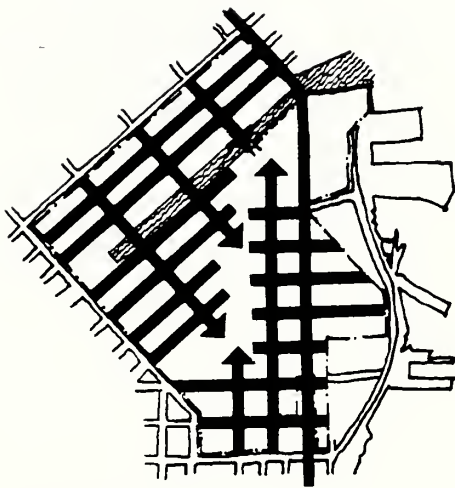
This concept plan would utilize a meeting of the South of Market and Third Street grids somewhere on the site. Wherever the two grids meet, that intersection must be resolved. Fragmented, or odd-shaped areas are created by the



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2.2 Street Grids

two grids where they meet but these are opportunities for major open space or the use of curvilinear connecting streets. Use of the mixed grids could provide a great variety of different open spaces at their central juncture and would permit Third Street to continue through the project along its current alignment.



Mixed Grids

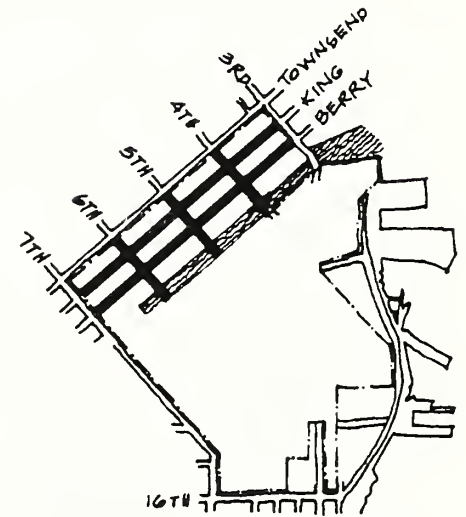
Numerous dead-end and inefficient streets could be created by a mixed grid with central open space. However, such cul-de-sacs could offer quieter residential streets with reduced traffic volumes. The central area of the project would be divided into two smaller areas by the open space between the two street grids which could become a divider between or a seam connecting them. High land use efficiency would be difficult to achieve on the odd-shaped parcels at the juncture of grids, although this open space could add interest and amenity. The reiterated block pattern of most San Francisco neighborhoods cannot be achieved using mixed grids.

Views to the Bay from the interior and western areas of the site would be shortened where the streets end in the center of the site. View corridors along streets would focus on open space internal to the site.

2.3 North of Channel Arterials

2.3 North of Channel Arterials

There are three roughly east-west City streets which serve the Mission Bay site north of the China Basin Channel: Townsend, King and Berry. These three parallel streets divide the area between Townsend Street and the Channel into three blocks each approximately 250 feet deep. The typical South of Market block is about 550 feet deep between major streets. The North Channel Arterials not only serve this site but are also important as links in the South of Market street system which could connect the waterfront with the Showplace Square area and the I-280 freeway. Similarly, these streets may become routes for future Muni Metro and Caltrain lines although the Metro and Caltrain implementation schedules vary. The Metro is likely to be developed before any Caltrain undergrounding options are realized.



North of Channel Area

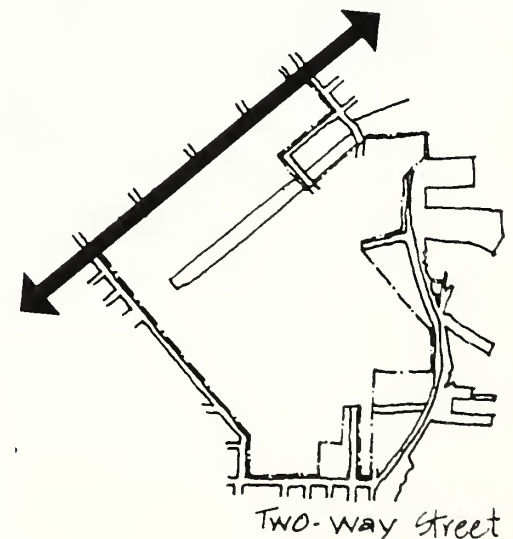
Consideration of Townsend and King Streets as a one-way pair is possible only if the Caltrain Station and its tracks are either relocated to Seventh and Channel Streets or undergrounded. This also affects the connection of Fifth and Sixth Streets from the South of Market into the site.

2.3.1 Townsend Street

Townsend Street is on the north edge of the site and runs from The Embarcadero to the center of the Showplace Square area. The right-of-way on Townsend is about 82 feet. Alternatives for the ultimate function of Townsend are described below.

2.3.1.1 Local Service Two-Way Street With or Without a Major Transit Function

A two-way street on Townsend would complement a boulevard operation with Muni Metro on King Street. The Muni Metro could be routed in the center or along the south side of a two-way Townsend with a major transfer to the Peninsula Commute service provided at an underground Caltrain Station. However, Muni Metro service would not be routed on Townsend if the Caltrain service were not located on Townsend.

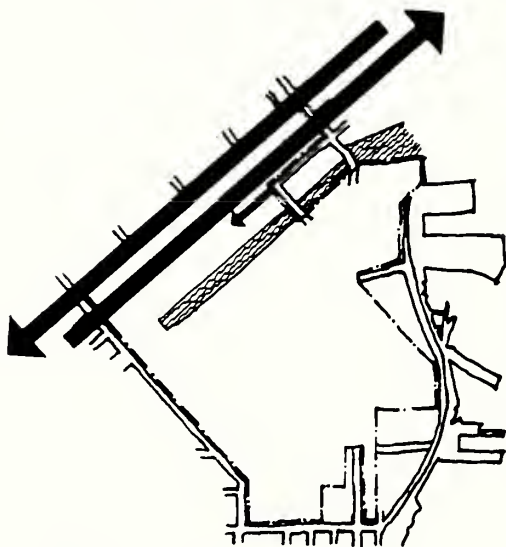


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2.3 North of Channel Arterials

A disadvantage of attempting to route any major transportation service on Townsend is that it requires reconsideration of the approved plans for the South Beach Redevelopment Area. These currently show limited through traffic on Townsend to The Embarcadero to enhance housing desirability. The Muni Metro would generally be considered to have less of an impact than a major arterial, particularly if engineered with sound-absorbing elastomeric rail mounts and other features, but would still not be consistent with the present South Beach plan. It would likely require a side-running Muni Metro (see 2.6.2.1) on The Embarcadero, not a median strip as presently contemplated in the South Beach Plan.

2.3.1.2 Through Traffic One-Way Street With or Without a Major Transit Function



One-Way Couplet

Townsend could be designed to serve as part of the one-way South of Market street system to the north and would serve the project as part of a one-way couplet with a one-way King Street. Townsend would serve traffic destined for the project as well as serving trips between the waterfront and the I-280 freeway and Showplace Square. A one-way couplet would have clear traffic operations advantages, such as the ease of synchronizing traffic signals and reduced turning movement conflicts at intersections. However, this type of operation on Townsend would conflict with the current plans for the South Beach project. The overall traffic service advantage for the entire area from South Beach to Showplace Square provided by the one-way operation may, however, offset the benefits of limiting traffic on Townsend that is currently being implemented in the South Beach area. Also, while a one-way couplet carries traffic better than a boulevard, it requires two streets to bear heavy traffic volumes.

The Muni Metro could be located on a one-way Townsend, on the side of the street. Locating the Metro on a one-way Townsend would probably require a widening of the existing right-of-way by 30 to 50 feet and substantially impact the South Beach area at Townsend.

2.3 North of Channel Arterials

2.3.2 King Street

King Street is a partially developed right-of-way running from The Embarcadero to the intersection of Division and DeHaro Streets. The King Street right-of-way is approximately 75 feet wide. The ultimate uses of King Street are indicated below.

2.3.2.1 Through Traffic Two-Way Boulevard With or Without a Major Transit Function

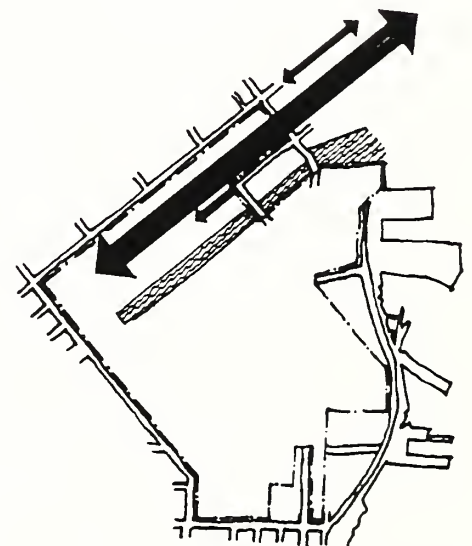
King Street could be designed as a two-way boulevard connecting with The Embarcadero Boulevard and including the Muni Metro extension to the Caltrain Station at Fourth and Townsend Streets. The right-of-way for this boulevard should be between 150 feet and 160 feet wide in order to incorporate all required street, transit, pedestrian activities and landscaping.

The I-280 plan shows the boulevard serving new freeway ramps and then turning south across the Channel but not connecting to the areas west of Mission Bay, such as Showplace Square. In order to fully develop the street system in this area of the City, all major arterials need to be integrated into the existing City grid and King Street, as a major thoroughfare, should be designed to serve the entire area between the waterfront and Showplace Square.

If the Caltrain Station is not located adjacent to or under King Street, the Muni Metro need not be routed on this boulevard. It could serve the new development almost as well and could serve existing South of Market areas better if routed on Townsend Street. The width of the boulevard could be reduced by about 44 feet or more landscaping could be provided here by locating the Muni Metro service elsewhere.

2.3.2.2 Through Traffic One-Way Street With or Without a Major Transit Function

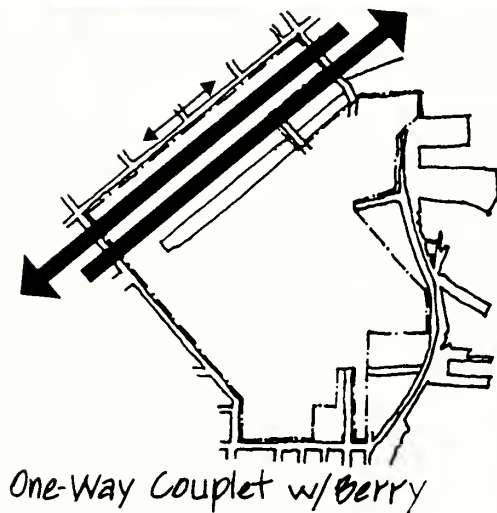
The current City policy for the development of King Street as shown in the recently completed I-280 Transfer Concept Report is for a one-way couplet with Berry Street, with a Muni Metro extension along the north side of King Street to the



Boulevard

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2.3 North of Channel Arterials



Caltrain Station at Fourth. As an alternative to a boulevard, a one-way street would require less right-of-way, could be more fully landscaped and could provide for more efficient traffic movement. King Street could also be coupled with Townsend as discussed above. A disadvantage of a one-way street is the fact that its image is one of swift traffic movement while a boulevard, if adequately designed and landscaped, may suggest more of a sense of place for vehicles and pedestrians. If Townsend and King were a one-way pair, any later undergrounding of the Caltrain on either Street would disrupt substantial traffic flow.

If the Caltrain Station were located near to or under King Street, the Muni Metro should also be located near this right-of-way to assure convenient transfers. If Muni Metro were located on a one-way King Street it would have to be side-running. (See 2.6.2.1).

2.3.3 Berry Street

Berry Street is a partially developed right-of-way south of King running from The Embarcadero to De Haro Street. The Berry Street right-of-way is about 82 feet wide. A sewer box culvert 17.5 feet square is located under Berry Street. The ultimate uses for Berry Street are:

2.3.3.1 Through Traffic One-Way Street With or Without a Major Transit Function

Berry Street could be coupled with King Street to form a one-way street system across the north side of the Channel consistent with the I-280 Transfer Concept Program. The South Beach Plan, as well as the I-280 Transfer Concept Program, has included such a one-way couplet connecting to The Embarcadero Boulevard at Second Street. The Muni Metro could be routed on a one-way Berry Street. It would be side-running and would be some distance from the potential locations for the Caltrain Station (see 2.6.1) and from the South of Market area.

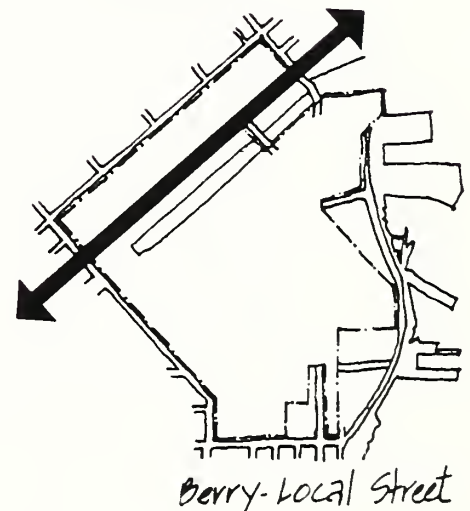
2.3 North of Channel Arterials

Berry Street is not as good a route for through traffic between the waterfront and Showplace Square as are King and Townsend because it does not easily connect with the Showplace street system. Because Berry is close to the Channel crossings, its intersection with Third and Fourth Streets could be easily congested if it were planned as a major traffic carrier. This could reduce the already-limited capacity of the two bridges.

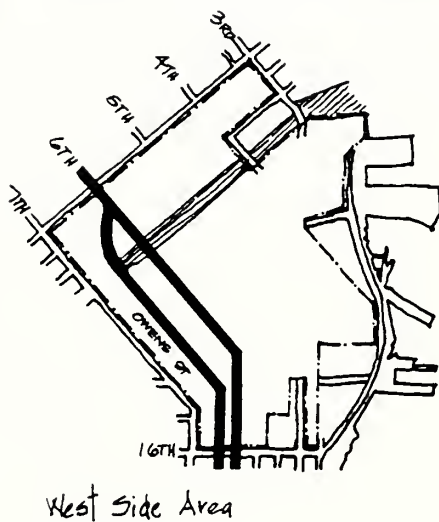
Also, developing Berry Street as a through route along with Townsend and King Streets would divide the area north of the Channel into three relatively narrow blocks, and somewhat curtail the development and amenity potential of this area. Development of Berry also would preclude planning of major open space and development on the north side of the Channel.

2.3.3.2 Local Access Street With No Through Transit Function

The Berry Street right-of-way could be used as an access route to the developments facing the Channel and not be connected between major streets. There would be no major transit routes on the right-of-way but local service could be provided if needed to supplement the main corridor transit service on King or Townsend Streets. Portions of the right-of-way could be developed or used for open space. Used in this fashion, the Berry Street right-of-way could provide flexibility in building layout and improve the opportunity for large open space.



2.4 West Side Arterials



2.4 West Side Arterials

The west side of the site is cut off from the adjacent City street system by the mainline/Caltrain railroad tracks and by the I-280 freeway and its ramp structures. While Seventh Street forms the western edge of the project, it does not serve the site except in the area near its intersection with Townsend and King Streets, and at Sixteenth Street. The project needs a west side, roughly north-south thoroughfare not cut off by the railroad and the freeway to alleviate traffic loads on Third Street. Extension of such an arterial north of the site requires relocation or undergrounding of the Caltrain Station.

Because Seventh Street does not directly serve the project site, the only available streets which link the areas north and south of the Channel are Third and Fourth Streets which are limited in capacity by the existing bridges. The west side arterial would provide an additional Channel crossing for both automobiles and public transit vehicles (see 2.6.2.4).

South of the Channel there are two possible rights-of-way available for the west side arterial, on either Owens or Sixth Streets. North of the Channel the extension of Sixth Street is the only logical route available.

This would necessitate removing the navigable waterways designation for the western-most end of the Channel. Such a process involves coordination with and concurrence by several other public agencies. It would also impact the western end of the Mission Creek Harbor Association berths.

2.4.1 Owens Street

Owens Street is about a 75 feet wide partially developed City street right-of-way running from about Channel to Sixteenth Streets. The right-of-way is located parallel to and approximately midway between Sixth and Seventh Streets. There is a 66-inch force main located under Owens Street.

The advantages of Owens Street as the west side arterial would be that (a) it is the furthest west of the available rights-of-way so that a new crossing of the China Basin Channel would have a

2.4 West Side Arterials

lower impact on the waterway navigability status and upon the Harbor Association; (b) it is also closest to a possible location for the Caltrain Station at Seventh and Channel Streets so that transit service could be easily routed to serve the Station; (c) it is closest to the freeway so that the busier and noisier local thoroughfare would be located near the freeway noise, leaving the areas east of Owens available for local street and residential development.

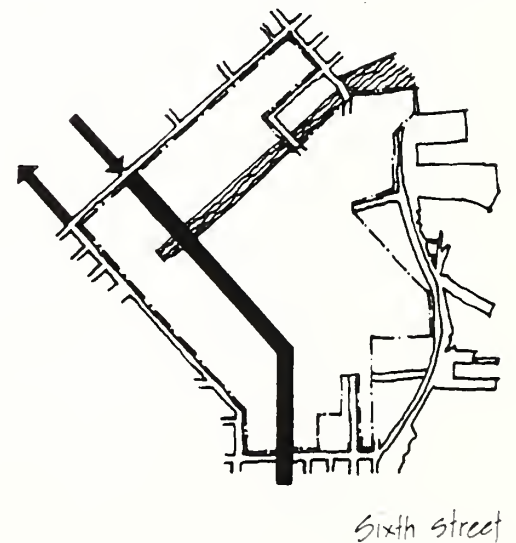
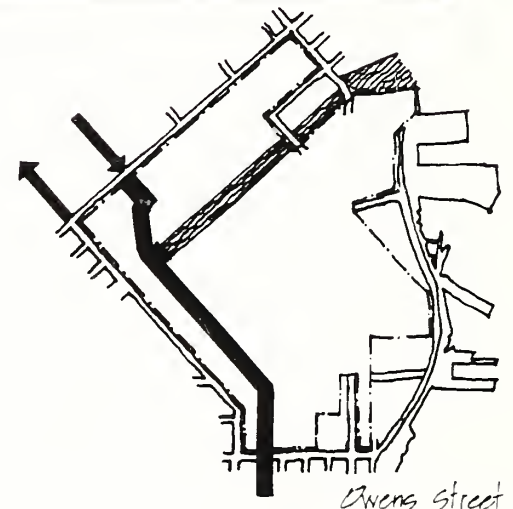
The disadvantage of Owens Street if it is used for routing Metro south of the Channel may be in its distance from the interior of the project, thus discouraging use of Metro by Mission Bay's residents and visitors.

2.4.2 Sixth Street

Sixth Street is an 82 feet wide right-of-way developed as a City street south of the Channel and north of Brannan Street. There is a 30-inch by 48-inch by 2,000-foot sewer box located under Sixth Street south of the Channel. The existing ramps from the I-280 freeway touch down at Sixth and Brannan Streets and block the extension of Sixth into the project site. A crossing of the Channel at Sixth would have a greater impact on waterway navigability status and the Harbor Association.

South of the Channel the use of Sixth Street as the west side arterial could provide for local shopping for residential development on both sides of the main street. Through traffic on Sixth could adversely impact nearby residences. If the Caltrain Station is not relocated, the southerly extension of the Muni Metro service could be via Sixth Street and would be closer to the interior of the project than if the Muni Metro were located on Owens Street. It should be noted here that residents usually prefer living one block from a transit street rather than on that street. If the Station is moved to Seventh and Channel Streets the Muni Metro would have to be routed to that location and would not be able to easily use the Sixth Street alignment.

An interim relocation of the Caltrain Station to Seventh and Channel with longer-term alternatives planned could, however, be addressed by designing a Metro line which serves the



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2.4 West Side Arterials

Caltrain station during that interim while retaining a permanent alignment best suited to the project's needs.

North of the Channel either the Owens or Sixth Street arterial would have to transition to a Sixth Street alignment in the vicinity of King Street. The extension of Sixth Street north from the project to meet the existing Sixth Street at Brannan Street is important in order to permit the most efficient operation of the South of Market street system. This connection would require removal of one or both freeway ramps at Sixth and Brannan Streets. Sixth Street is tentatively planned to become one-way southbound and will work with the northbound Seventh Street to connect the northwest corner of the project with the Civic Center and the westerly portions of the South of Market. If Sixth Street is not connected from the project site to the South of Market grid, Mission Bay-destined traffic will be diverted to Fourth Street and cause additional congestion problems at the Fourth Street Bridge and within the project street system.

2.5 East Side Arterials

2.5 East Side Arterials

The east side of the site is currently served by Third and Fourth Streets, which are limited in their capacity by the existing bridges across China Basin Channel. Truck and automobile traffic currently use the two streets for Port of San Francisco activities and to go north or south through the site. The two streets carry traffic to Market Street and beyond to the north and Third Street extends through the Bayview neighborhood to the south. Third Street follows the historic Long Bridge Route which spanned the mouth of Mission Bay.

It should be noted that Third Street presently serves as a major at-grade traffic route for about seven miles along the eastern edge of the San Francisco peninsula. If Third Street is rerouted, care would need to be taken to ensure the continuous flow that is presently provided.

South of China Basin Channel there are two possible routes that Third and Fourth Streets can take. North of the Channel these streets will essentially remain as they exist today.

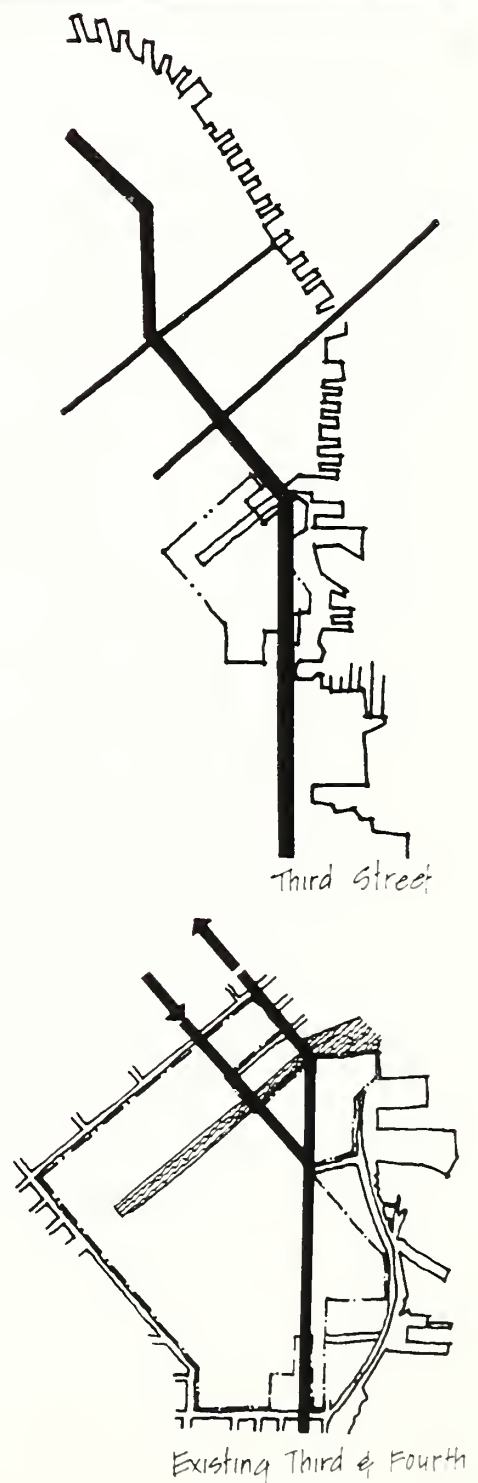
2.5.1 Existing Third and Fourth Streets

The routes for Third and Fourth Streets could be maintained as they now exist, both to the north and the south of the Channel.

This alternative is the least expensive and provides a direct path for traffic to travel. This existing alignment provides travelers from neighborhoods south of the site with direct visual as well as vehicular access to South of Market and Downtown. It provides Bay Bridge access for maritime cargo. However, as an arterial, Third Street south of the Channel will be potentially disruptive to a Mission Bay residential neighborhood on either side.

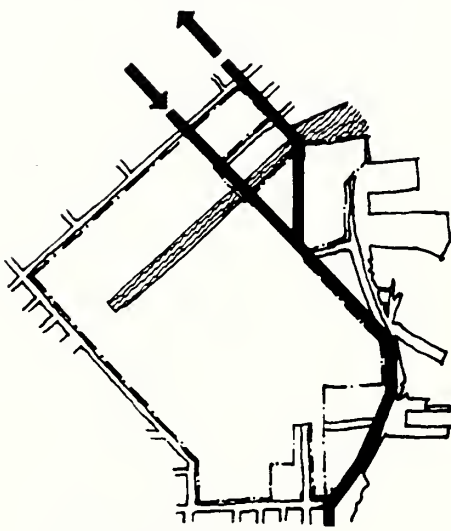
2.5.2 Fourth and China Basin Streets

South of Channel and below the intersection of Third and Fourth Streets, Third Street could be vacated south to Sixteenth Street. Fourth Street would be extended until it



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2.5 East Side Arterials



Fourth & China Basin

intersects China Basin Street and China Basin would become the major east side arterial until it again intersects the Third Street right-of-way immediately south of Mariposa Street. Third Street would follow its existing alignment until it reaches Fourth Street. Alternatively, Third Street could continue southeast directly in line with the Third Street Bridge to intersect China Basin Street, then loop south around Mission Bay.

These changes to Third Street would allow the arterial to least affect the new Mission Bay residential neighborhood. The new route goes around the neighborhood, not through it. The change to Third Street requires relocation of utilities which are presently in the Third Street right-of-way. The traffic flow along the new route will not significantly change and a view of the Bay would be opened for its users.

A disadvantage of this route is that redirecting major traffic flows to the Bay's edge may diminish future opportunities to provide public access and amenity there.

2.6 Rail Transportation

2.6 Rail Transportation

Rail transportation systems are some of the most important determinants for the Mission Bay Plan. There are two public transit systems to be considered: The Peninsula Commuter Rail Service (Caltrain) and the Municipal Railway Surface Rail Systems (Muni Metro Light Rail Service and the "E" Line Streetcar). Additionally, freight rail service must be maintained between the Mainline and the waterfront via the Belt Railroad north of the Channel and to the Central Waterfront area south of the Channel.

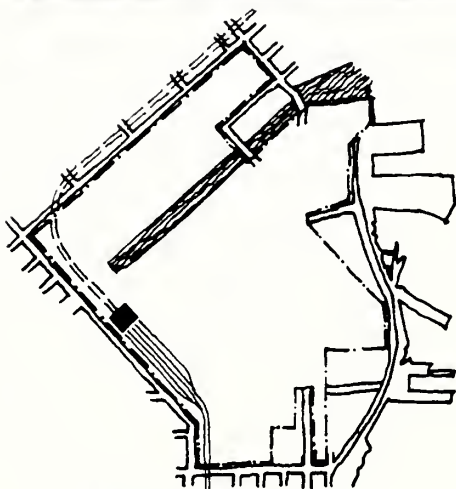
2.6.1 Peninsula Commuter Rail Service (Caltrain)

The most important issue for the Commuter Rail Service is where the San Francisco terminal should be located. The public agency currently responsible for the operation of the service, the California Department of Transportation (Caltrans), would like to extend the service to a downtown underground location but a financial program to accomplish this work has not yet been developed. The current location of the terminal at Fourth and Townsend Streets requires several City blocks for its station and trackage. The existing surface trackage areas block the extension and connection of several sections of the street grid system between Townsend and King Streets, are a somewhat blighting influence on neighboring areas and impair the orderly development of this part of the Mission Bay site. Several new locations for the Commuter Rail Station have been suggested as a first phase of the aforementioned project to extend the service to downtown.

2.6.1.1 Under the Existing Freeway Structure at Seventh and Channel Streets

A right-of-way north from this site would be provided through the project to Townsend or King Streets which could accommodate the possible future extension of the Commuter Rail Service. This site would make use of the otherwise unusable area under the freeway structure in order to develop a 6 track surface terminal station. Muni Metro, "E" Line and other surface transit would be routed to the station in order to provide a convenient transfer for commuters.

2.6 Rail Transportation



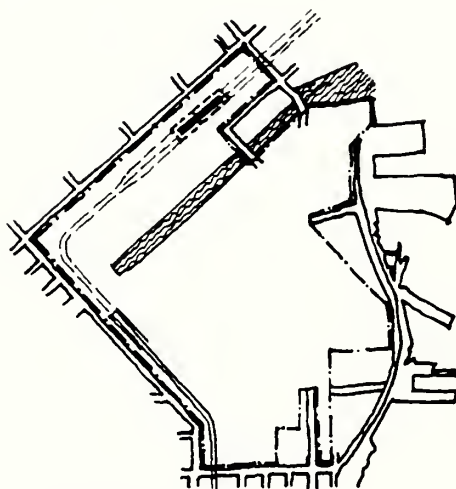
Seventh & Channel Station

This location would be the least expensive of the alternatives being considered. It could be developed quickly and it has the potential to better serve the area west of Seventh Street. It could enable connection of Division Street with the site. Lastly, it does not consume valuable north-of-Channel real estate.

On the other hand, it is over a half mile farther from downtown, the ultimate destination of most commuters, than is the current location. It is also farther from likely Mission Bay office areas north of the Channel. Also, it will require routing the Muni Metro to the western edge of the project in order to serve commuters and thus reduce Metro service to the project itself.

2.6.1.2 Under Townsend or King Street at Fourth or Fifth Street

This station would be developed as an underground way station rather than as a terminal and would include sufficient tail tracks to reverse trains at this location. Future extension would be possible by continuing the subway to a downtown Terminal.



Station at Fourth

The advantages of this location are that existing commuters would not have to adjust their commute to a station further removed from their ultimate destinations. If the Muni Metro were routed on the same street as the Commuter Service a direct escalator connection could be provided for the transfer between the services. Also, the Muni Metro would not have to be routed to the western edge of the development south of the Channel and could provide better service for Mission Bay.

However, the costs of building an underground station and subway would be higher than for a surface station. The costs for construction and the amount of disruption to existing development would be less on King than on Townsend Street. However, the timing on the commitment of public funds for this project is not clear. The excavation and construction of a King Street station and associated trackage could occur after King Street is developed as a major street in the first phase of Mission Bay and disrupt both Muni Metro service and the Mission Bay development process. This alternative would,

2.6 Rail Transportation

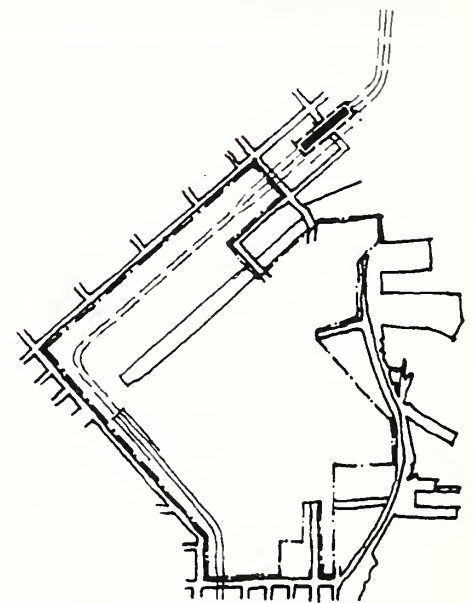
therefore, require careful phasing and scheduling of construction.

2.6.1.3 Under Townsend or King at Second Street

This location has similar characteristics as described above for the underground station at Fourth Street but is about 2,000 feet closer to the job concentrations planned for the eastern portion of the South of Market. The main advantage for this location is it will be within walking distance for the most jobs of any of the sites considered.

A major disadvantage of this site is that it commits a downtown extension of Caltrain to the Embarcadero alignment. Current City and regional staff preference is for a Second Street alignment should the Peninsula Commuter Service be extended downtown. The Second Street alignment is not possible if the station were located on Townsend or King at Second Street.

This location will not serve the job center of the Mission Bay development as well as the Fourth/Fifth Street location. It will require an area for rail tracks which extends through the South Beach project along The Embarcadero and would require commitment of construction funds in the immediate future in order to be fully coordinated with that project.

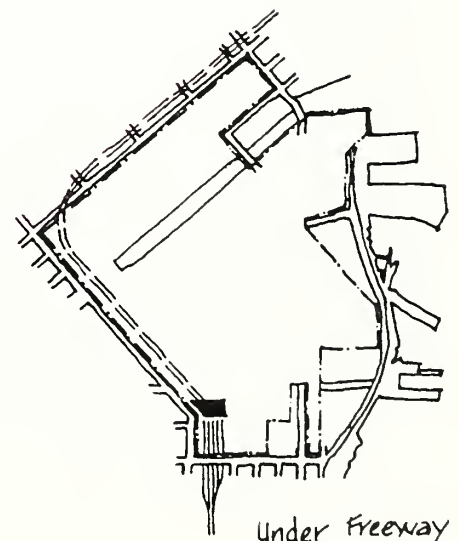


Station at Second

2.6.1.4 Under the Freeway at Seventh and Sixteenth Streets

The operation of a station at this location would be similar to that described above for a terminal at Seventh and Channel Streets. The station would provide six tracks on grade with a station house. A right-of-way north from this site would be provided through the project to Townsend or King Streets which could accommodate the possible future extension in subway of the Commuter Rail Service to downtown.

Advantages of this location is that it would permit removal of all tracks north of Sixteenth Street, eliminate the grade-crossing at Sixteenth Street, the last such crossing on the mainline in San Francisco, and allow extension of several streets into the project which cannot be connected as long as



Under Freeway

2.6 Rail Transportation

the tracks exist under the freeway. A much improved connection between the project and Showplace Square and Potrero Hill area could be provided as Hooper, Irwin, Hubbell and Daggett Streets could be extended into the project. The Muni Metro could be routed to serve Mission Bay north of the station and then be routed to the commuter terminal, thus providing a convenient transfer for commuters to downtown.

Disadvantages of this site are that it is furthest removed of all those being considered from the job concentrations in the South of Market area and at Mission Bay and would have the greatest negative impact on the Commuter Rail Service. The cost of developing this location could be high as it may require a reconstruction of the north end of mainline Tunnel No. 1 in order to provide the space required by a six-track fan approaching the station. The Muni Metro crossing of Sixteenth Street would require a high volume operation and limit the traffic capacity of the street near the station.

2.6.1.5 Under the Block Bounded by Townsend, King, Fourth and Fifth Streets

This has similar characteristics as underground stations under Townsend or King at Fourth or Fifth Street (see 2.6.1.2). However, it is located within private property rather than within the public street right-of-way.

The advantage of this location is public costs of constructing a new Caltrain station in the project area are reduced. This is because the land has been cleared; there are no street utilities to work around; disruption to adjacent development, traffic and transit during construction would be minimized; and excavation and foundation work is already expected on the block for constructing mid-rise buildings.

However, the timing on the commitment of public funds for a Caltrain extension is not clear. Excavation and construction of a station at this location could only occur as a closely integrated design element of buildings to be developed on the

2.6 Rail Transportation

block. This approach could disrupt the Mission Bay development process if the timing were not well synchronized.

2.6.2 Muni Metro/E Line Streetcar

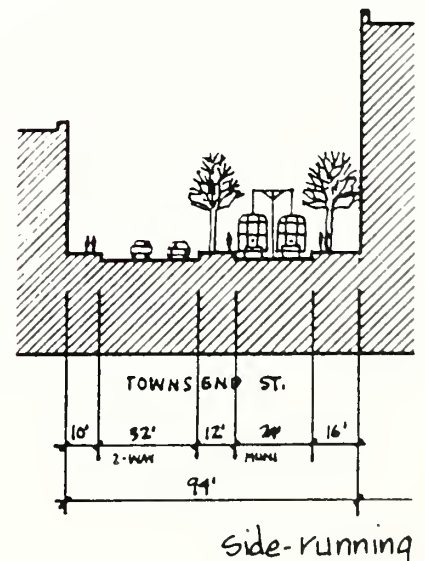
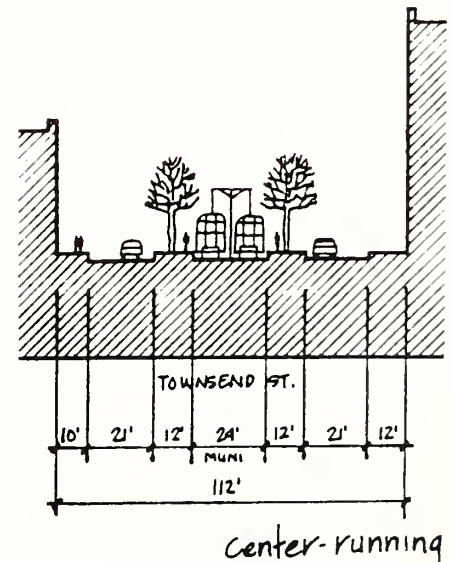
Current City policy is to extend the Muni Metro service from Market Street along The Embarcadero to the Caltrain Station at Fourth and Townsend Streets. The City also plans to develop a streetcar line from the Fisherman's Wharf area along The Embarcadero to join with the Muni Metro tracks south of the Ferry Building and to also serve the Caltrain Station. If the Caltrain Station is relocated, the Muni Metro and E Line should be extended to provide the Peninsula Commuters with a convenient transfer to Muni service. The location of the Muni Metro and E Line routes is, therefore, linked to the decision on the location of the Caltrain Station. Options for the Muni Metro and E Line are:

2.6.2.1 Center- versus Side-Running

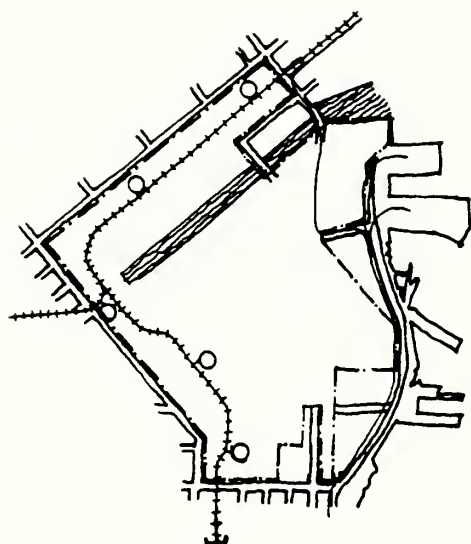
A center-running route avoids conflict with vehicle access to street frontage, is less complicated to deal with at street intersections, and can be more easily separated from non-vehicle traffic between stations.

Center running platforms require all system users to be exposed to moving traffic immediately adjacent to each platform. Side-running permits patrons using the service in the "inside" direction to be protected from traffic noise and hazards because the platform can be integrated into the sidewalk area. The outside platform on a side-running system would experience similar problems as the center-running platform.

Side-running is constrained by each of the features listed above as an advantage for center-running. Side-running may, however, be more easily separated from vehicular and pedestrian traffic which could therefore be a substantial operating advantage for a high-speed Muni Metro style of services. Side-running can have a service advantage where most users approach the route from only one side of the street. This situation occurs along The Embarcadero because



2.6 Rail Transportation



Route Option to South

most users come from locations inland from the Bay. Combined with landscaping, it can provide buffering between neighboring development and a heavily-trafficked roadway, as transit vehicles pass much less frequently. Side-running is almost always used on one-way streets.

2.6.2.2 Townsend Street

The Muni Metro and E Line should be located on Townsend Street if the Caltrain Station is or will be constructed under the street. As noted earlier, the Muni Metro may be developed before Caltrain undergrounding is realized. Surface rail would be in the center or along the south side of a local access two-way Townsend or on the south side of a through traffic one-way street. The use of Townsend is constrained by the current plans for the South Beach Project and will have to be coordinated with that work before a firm plan for the use of the street can be developed.

2.6.2.3 King Street

Current City plans call for the Muni Metro and E Line to be located along the north side of a one-way King Street. A median and north side Metro operation along a two-way King Boulevard will also be evaluated. If the Caltrain Station is relocated under King the surface rail will have direct transfer capability. A direct transfer means the two transit systems are located as close together as physically possible and any walk from one system to another is kept to the absolute minimum distance. The same phasing issue arises as for Townsend, as Muni Metro would likely precede Caltrain undergrounding. If Caltrain is relocated under Townsend and the surface rail transit is located on King it would be necessary to provide as convenient a connection between the streets as possible, and the transfer between transit services would require a short walk. It is desirable to limit walking distance for transferring patrons as much as possible, and a direct connection is preferred.

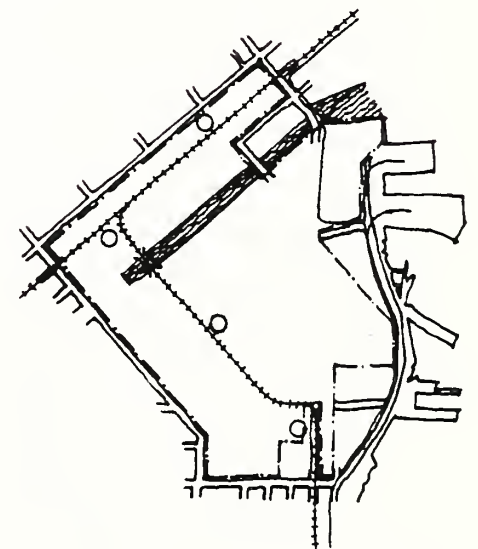
Surface rail would run in the center of a two-way boulevard or would be on the north side of a one-way King Street. As discussed above, the right-of-way required for a two-way

2.6 Rail Transportation

boulevard including pedestrian, vehicle and surface rail transit functions would be from 150 to 160 feet. A disadvantage of having all these functions on a single two-way street is the large right-of-way requirement.

2.6.2.4 Channel Crossing

The surface rail transit could theoretically be brought across the Channel on either of the existing Third or Fourth Street bridges or on a new crossing. With the full development of Mission Bay the capacity of the existing bridges will be taxed heavily. Expected vehicle congestion would interfere with the efficient operation of any surface transit system which was sharing use of those bridges. Because the Muni Metro would be designed as a relatively high speed service which requires an almost exclusive right-of-way, the shared use of the existing bridges would not be appropriate for a Muni Metro route. The Muni Metro should cross the Channel on a new bridge in either the Owens or Sixth Street alignments.

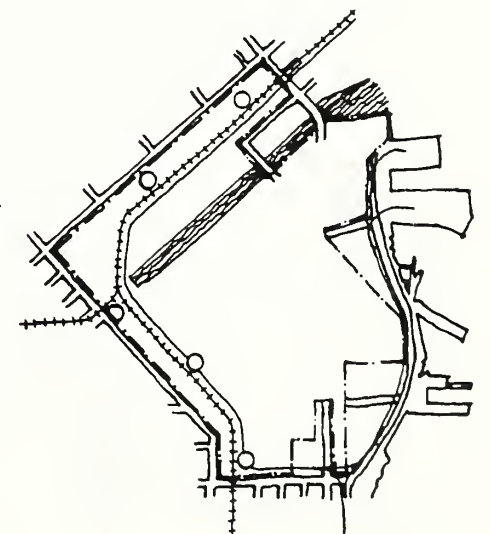


Channel Crossing

2.6.2.5 Routes South of the Channel

South of the Channel the Muni Metro and the E Line will have to serve the Caltrain Station if it is relocated at Seventh and Channel. The Muni Metro could travel south from the Station on or adjacent to Owens Street to provide service to Sixteenth Street with further southerly extensions to be provided as required by City policy. The E Line could be extended west from the Station on the Division Street right-of-way into Showplace Square, with a possible connection up Eleventh Street to Market Street at Van Ness Avenue. This would complete a surface rail transit loop around the South of Market area.

If the Caltrain Station is not located at Seventh and Channel, or if it is relocated there on an interim basis, the Muni Metro could run south on Sixth Street to Sixteenth with possible additional southerly extensions. This or other Metro alignments south of the Channel could be pursued on a staged basis if the Seventh and Channel station were to be a temporary terminal. The E Line would not cross the Channel at all. North of the Channel the E Line could be extended directly to



King Transit Corridor

2.6 Rail Transportation

Showplace Square along either King or Townsend Streets and then complete the potential loop of the South of Market area as described above.

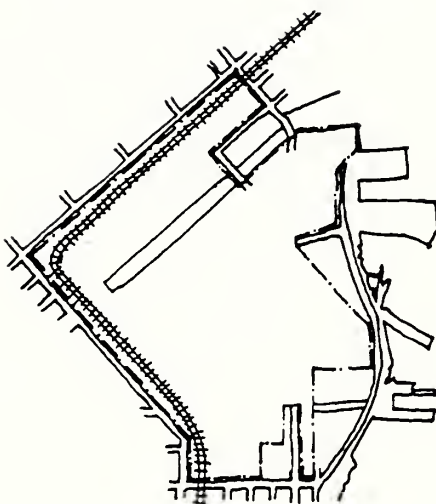
2.6.3 Rail Freight Service

Rail freight service to the Port of San Francisco must be maintained both north and south of the Channel. North of the Channel the Belt Line serves the piers of the Northeast Waterfront. South of the Channel it will be necessary to provide a rail connection between the Central Waterfront and the Mainline.

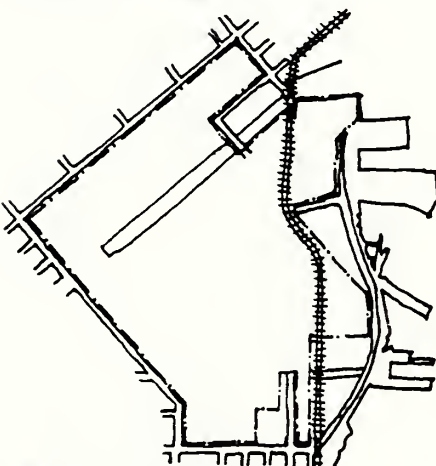
2.6.3.1 Belt Railroad Service

The Belt Railroad currently serves the waterfront north of the Channel and connects to the mainline on King Street. There are two alternatives to continuing the mainline connection to the Belt Line. A route through or around the northwest corner of the project to meet the mainline under the freeway near Seventh and Channel would parallel the existing route and could be a surface equivalent to the underground Commuter Rail Service. A disadvantage of this route is that it could require space in either Townsend or King Streets where right-of-way requirements are large even without the Belt Railroad, and it would introduce freight rail traffic on the reconstructed street system. Alternatively, the Belt Railroad could be situated within traffic lanes, with its use restricted to night hours when traffic conflicts are reduced. The Railroad must reach its interchange yard near King and The Embarcadero.

A second route would use the existing track on the Third Street bridge and reconstruct the trackage south of the bridge to connect with existing tracks in Illinois or China Basin Streets. Re-alignment of the track north of this bridge may also be required to replace an existing short radius curve. This route would be least disruptive to the project but could require a greater investment in new trackage.



Beltline - Northwest Route



Beltline - 3rd St.
Bridge Route

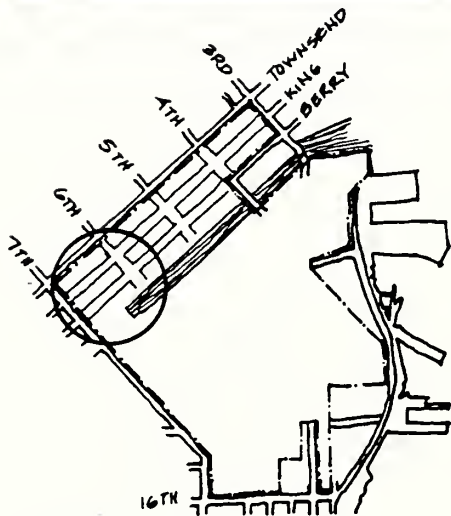
2.6 Rail Transportation

2.6.3.2 Waterfront Connection to Mainline

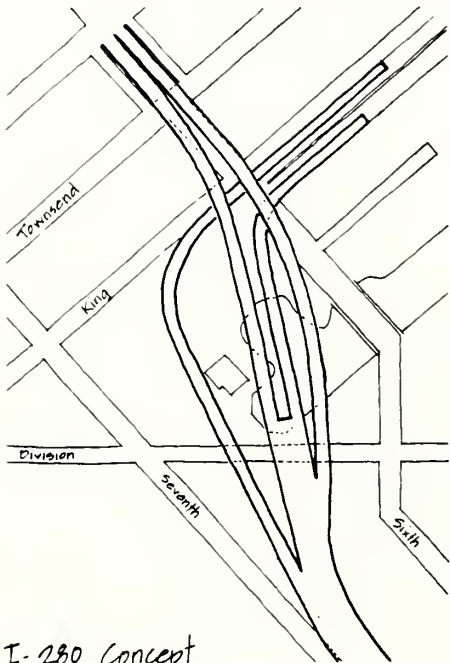
Piers 48 to 64 are currently connected to the rail mainline by trackage which proceeds easterly across the project site from the north end of Tunnel No. 1 in the vicinity of Sixteenth Street. This connection or one of equal capacity will need to be maintained until an alternative rail route is provided. Such an alternative could be available when the Port of San Francisco completes its plan to build a rail bridge across Islais Creek, as part of its current Container Terminal Modernization Program, which will permit rail access to these piers from the south up Illinois Street. Other possibilities to connect the mainline with Illinois Street are currently under investigation.

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2.7 I-280 Freeway Ramps



Concept Location



I-280 Concept

2.7 I-280 Freeway Ramps

The existing terminus of the I-280 Freeway will be revised to meet the needs of both the Mission Bay project and of the I-280 Transfer Concept Program recently adopted by the Board of Supervisors. The I-280 Program proposes removing the existing freeway structure between Third and Sixth Streets and constructing new ramps to serve the east-west traffic across the north side of the project to and from The Embarcadero. The existing north-south ramps which touch down at Sixth and Brannan Streets would be maintained in the current I-280 Program. Several alternative ramp configurations including the ramp system proposed in the I-280 Program are described below. These initial concepts will require further investigation.

2.7.1 I-280 Transfer Concept Program Ramp System

Existing north-south ramps to Sixth and Brannan Streets would be maintained and new east-west ramps oriented toward The Embarcadero and King Street would be constructed. The new ramps would touch down on King and Berry between Fifth and Sixth Streets. An alternate solution would have both ramps touch down on King Street.

With this solution, the existing heavily congested intersection at the ramp touch down at Sixth and Brannan Streets is maintained; the extension of Sixth Street south of Brannan Street would be blocked by the ramp touch down; the extension of Sixth Street across King Street would be blocked by the new ramp system; the interchange would not relate to the South of Market one-way street system where Sixth would be one-way south and Seventh one-way north forming a couplet north to the Civic Center; and the connection of the Showplace Square area to the I-280 freeway would be indirect.

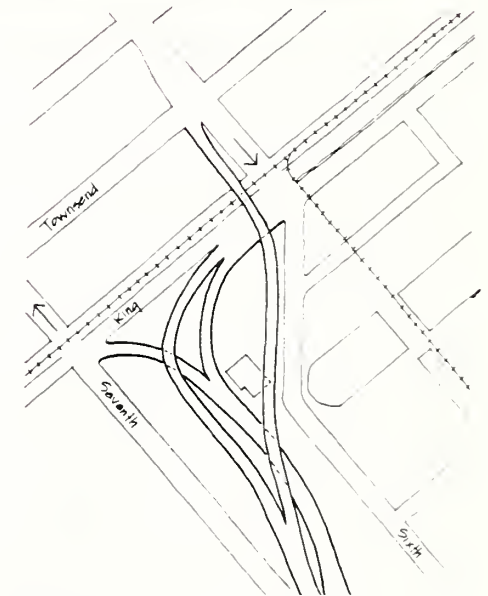
This ramp system would not require any expense to modify the Sixth and Brannan ramps, and it would direct incoming traffic across the north side of the project toward The Embarcadero. It would be sufficiently high to permit Division Street to be extended into the site.

2.7 I-280 Freeway Ramps

2.7.2 Revised Four Ramp System

The I-280 Transfer Concept Program ramp system can be improved by moving the touch down for the northbound off-ramp from Sixth and Brannan to Seventh and King and by moving the touch down for the east-west ramps west of Sixth Street. With these revisions it would be possible to connect most of the South of Market grid to the Mission Bay site and better serve those areas north and west of the site. The elimination of several turning movements would improve the efficiency of the Sixth and Brannan intersection. Sixth Street could be routed as a southbound one-way street from Brannan across King and south across the Channel.

However, the revised four ramp system would require the removal of the northbound off-ramp structure and the construction of a new northbound off-ramp which would increase the costs over the I-280 Program proposed amount.

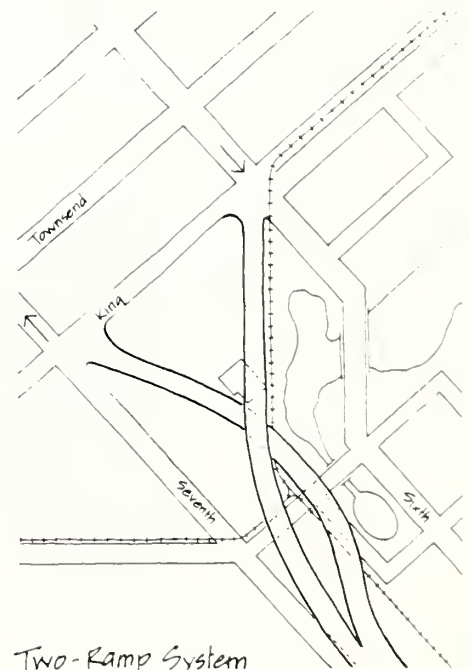


Revised Four-Ramp System

2.7.3 Two-Ramp System

A system minimizing the freeway ramp area would be possible with a one-way street pattern on the north side of the site. This would tear down the most freeway and require removal of the existing ramps to Sixth and Brannan. Traffic from northeast San Francisco would move on The Embarcadero to King and onto I-280 along east-west streets north of the Channel. New ramps would bring freeway traffic into two street intersections. A northbound off-ramp would end down at Seventh and King Streets and a southbound on-ramp would start at Sixth and King Streets. Operating as a one-way street system the intersections serve only two major directions of traffic flow and would be more capable to deal with the freeway traffic loads. The reduced ramp system would result in greater surface street traffic loads and possible levels of congestion for traffic trying to reach the freeway but would also provide the greatest relief from the intrusion of the freeway structure in the northwest corner of the site.

The cost of tearing down additional freeway structure would be higher than in the systems above but the new ramp construction could be less costly than for the other two alternatives.



Two-Ramp System

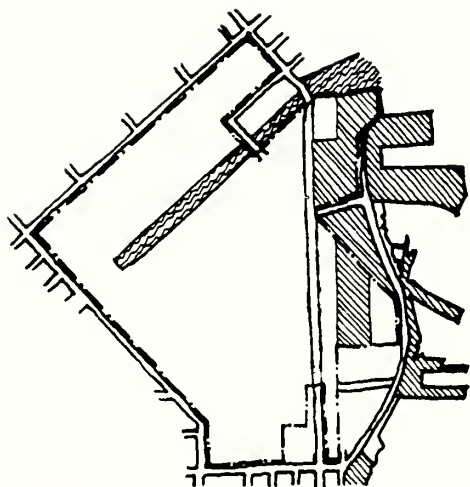
2.8 Port Activities East of Third Street

2.8 Port Activities East of Third Street

There are three possible futures for the port activity east of Third Street. Operations could continue as they presently do, be expanded, and/or be relocated. Each of these would have effects on Mission Bay as a residential neighborhood.

2.8.1 Present Activity Level

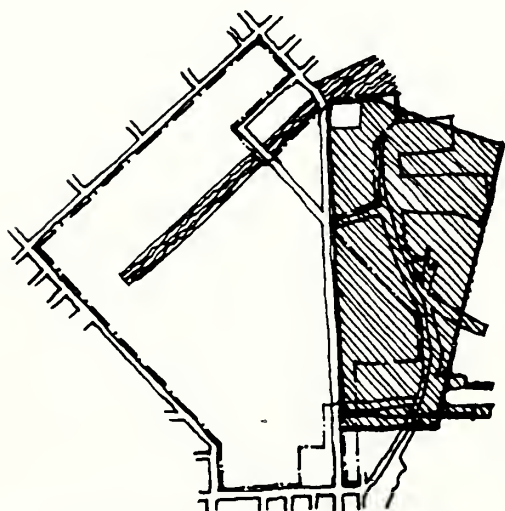
If the port activity stays about the same, it will not adversely impact the potential of Mission Bay. Portions of the site east of Third would remain in maritime use, while other presently underutilized parcels would go into other uses. The Mission Bay project could be planned as a San Francisco neighborhood. There would continue to be significant port and commercial traffic on Third Street. If that truck traffic were moved further east by shifting Third Street to China Basin Street, residential values in that corridor could be enhanced. On the other hand, future public recreation and access to that waterfront would be constrained by a major roadway near the water's edge.



Present Port Uses

2.8.2 Expanded Containerization

An expanded port with the container terminal called for in the Port's Master Plan would use all the land adjacent to and including the site east of Third Street. Because of traffic, noise, lights and other port activity, the parcels along the western frontage of Third Street would require buffering for housing.



New Container Terminal Uses

2.8.3 Relocated Maritime Activity

A reduction of port activity in the Mission Bay area along with shifting container terminal expansion to the waterfront south of the site would enhance the potential for waterfront residential and commercial activity along the shoreline. It would provide for a possible stronger pedestrian connection from housing to the waterfront and allow new land use organization, circulation, and parks and recreation areas. It would also have maritime advantages because all container facilities would be concentrated in one location, with potential

2.8 Port Activities East of
Third Street

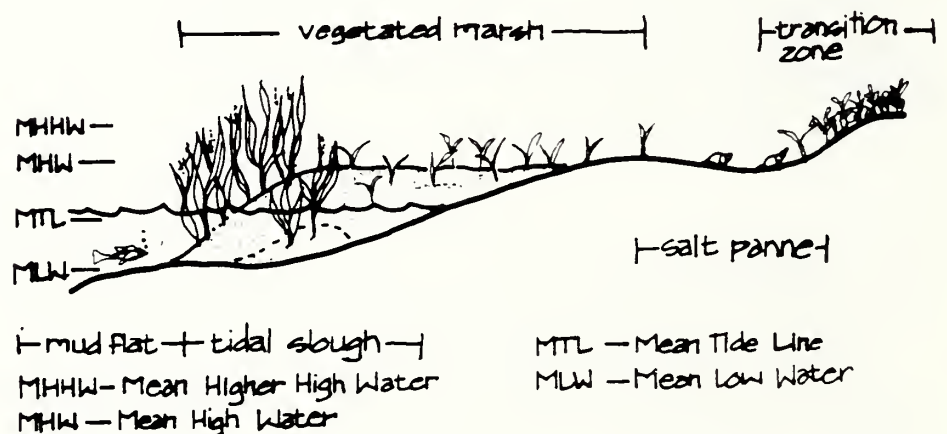
operating efficiencies and facilitating rail access. The disadvantage would be that the area east of Third Street is already designated for container terminal expansion in local and regional plans, and much of it is already under Port ownership. Port uses of the piers are expected to continue in full maritime use.

2.9 Wetlands

2.9 Wetlands

2.9.1 General Requirements

Wetlands may consist of marshes, mudflats, ponds, channels, and subtidal habitats. A typical tidal marsh is distinguished as a band of vegetation spreading between the unflooded upland to the continually submerged water basin. Within the band of vegetation can be found a mosaic of tidal channels; open, non-vegetated areas (either mudflats or pannes); shallow ponds; and low islands or levees which are flooded only on extreme tides. This area would provide a healthy setting for the feeding, resting, breeding and nesting of a variety of marine wildlife and shore birds.



Wetlands Habitat

Given the high cost of land throughout the Bay Area and the need to support a broad spectrum of wildlife needs, wetland managers have sought to create diverse habitats within close proximity. No one can afford the luxury of broad, expansive pickleweed marshes, for example, as existed historically. Instead, wetland restoration sites include buffers from adjacent development, creation of islands for protected upland

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habitat during high tides, and a network of shallow ponds, channels, and mudflats to support both feeding and nesting requirements of the resident and migratory birds. Thus, the characteristics that one normally associates with the historic and few remaining natural marshes of San Francisco Bay need to be modified so that a diverse set of habitats can be included within smaller areas.

2.9.2 Types of Wetland Possible at Mission Bay

Under the present conditions of drainage, storm water discharge, and tidal flows, saline marshes are the only type which could exist on or near the site. Salinities at this location in the San Francisco Bay system are usually between 25 and 33 parts per thousand (ppt) (normal seawater is 35 ppt and freshwater is 0 ppt). Freshwater discharge is limited to winter months only, and no major streams which might prolong freshwater flows enter the Bay at this location. Brackish water marshes require reduced salinities of between 1 to 10 ppt to occur for long periods of time during the growing season (up to 6 to 9 months). Given the large tidal prism in the China Basin and the small size of the residual tidal volume, freshwater inflows are quickly flushed within a matter of several tidal cycles. As a result, salinities within the China Basin are similar to those in the adjacent bay.

2.9.3 Advantages and Disadvantages of Locating a Wetland Habitat at the Mission Bay Project Site

The primary biological goal of locating a wetland at China Basin would be the creation of a more diverse habitat than presently exists. This would ensure that development of

¹ More detailed description of the characteristics of San Francisco Bay tidal marshes is given in Appendix A. The reader is also referred to: The Ecology of San Francisco Bay Tidal Marshes: A Community Profile prepared for the US Fish and Wildlife Service/Office of Biological Services, National Coastal Ecosystem Team, Slidell, LA.

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Mission Bay does not discourage present resident and migratory wildlife use. This would provide an area that could be utilized by the wildlife found along San Francisco's eastern shoreline during all stages of the tide. The protected nature of the China Basin would be supportive of vegetated marshes and the provision of roosting and nesting areas for birds during storms and high tide events. Another goal would be to highlight the observable tidal ecology as a balance to urban activity, providing a breathing space or respite for citizens as well as an educational resource for city children.

Additional wetlands proposals on the eastern shoreline include Candlestick Point National Recreation Area and Pier 98. The Candlestick Point General Development Plan calls for enhancing present wetlands areas within a 32-acre parcel north of the Yosemite Canal. Presently there are extensive mudflats, and the plan proposes creating a nature trail, boardwalk, and bird island. This area faces toward the southeast and is very exposed during major winter storms which are usually accompanied by strong southeast winds. Pier 98 on its south side includes a marsh and tidal mudflat area. The Port proposes to develop public access and observation areas to overlook this marsh.

An expanse of wetland can be viewed as an amenity or as unsightly, depending upon the contours of the mudflats and extent of vegetation. However, the primary disadvantage to locating a wetland within the Mission Bay project site is the impact of high-density development upon wildlife use. Noise, water pollution, water-borne trash, and human intrusion all impact a wildlife habitat. While this can be reduced through the planning process and with proper maintenance, one cannot expect to create a fully natural situation within a city. The creation of wetland habitats at Mission Bay requires diverse and buffered areas, to appeal to a limited number of wildlife species accustomed to human impacts.

The actual location of a marsh habitat relative to new development also must take into account: (1) the perceived effect of a marsh (positive or negative) on property values; and (2) the need to control the impacts of sewage overflows and decaying vegetation on exposed mud to preclude odors.

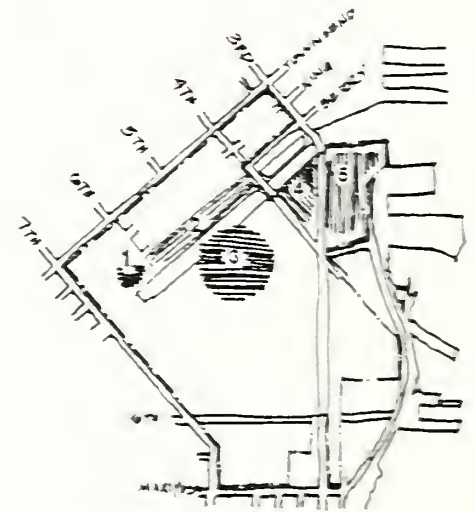
2.9 Wetlands

2.9.4 Wetland Site Alternatives

In the course of the design considerations for the open space element, a number of possible sites have been suggested for the wildlife area within a tidal wetland park. In addition, several questions have arisen over the size, configuration and the quality of habitat which could be created under certain acreage limitations. The purpose of this section is to provide an analysis of the various site proposals.

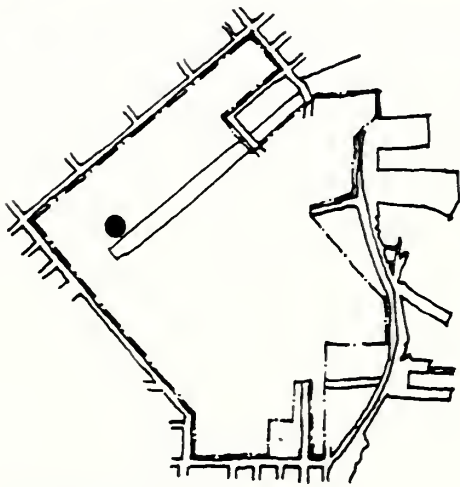
Five alternatives for the location of the tidal wetland park have been suggested in the design phase of the Mission Bay plan. Without discussing the physical constraints to the creation of tidal wetlands at various locations, this report will focus on the advantages and disadvantages of each of the locations in regard to wildlife usage. The alternatives that have been suggested are:

- Alternative 1: Beneath and east of the I-280 overpass at southwest end of Channel
- Alternative 2: Northwest side of Channel along Berry Street
- Alternative 3: Southeast side of Channel between I-280 and Fourth Street
- Alternative 4: Between Third and Fourth Streets
- Alternative 5: Mouth of Channel adjacent to Pier 48 and 50



2.9 Wetlands

2.9.4.1 Alternative 1



Alternative 1

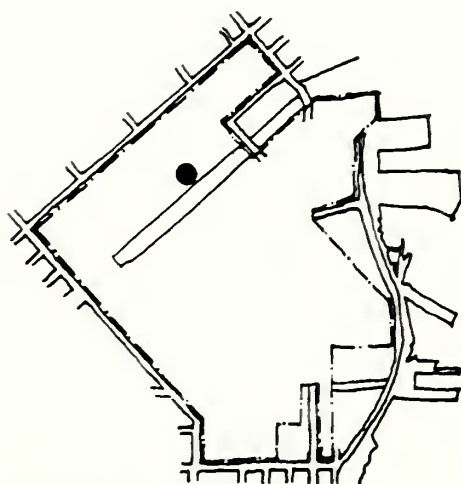
The advantages of Alternative 1 include: (1) use of a location unsuitable for other uses; (2) possible shallow water habitat due to siltation at head of channel: shorebird habitat; and (3) isolated habitat around bridge support pilings.

The disadvantages are that: (1) the site available is too small for a full-fledged habitat; (2) shading by highway supports would limit growth of plants; (3) limited wildlife use due to distance from the Bay and disturbance from surrounding uses; and (4) water quality problems due to the large sewage overflow structures nearby.

Conclusion: Despite the advantages of isolation, the shading would significantly limit vegetative cover and the use of the site by wildlife. The primary habitat created would be bare mudflats which might attract a few shorebirds. The noise of the freeway would disturb many other uses of the wildlife area, including human observation of birds.

Habitat Configuration and Size: The optimal use of the site would be the creation of islands. High siltation rates can be expected at the end of the channel and broad mudflats would eventually form. Some debris control would need to be initiated. Due to the relatively low habitat quality, a sizeable acreage that is not available here would be needed to overcome noise and limited vegetative cover.

2.9.4.2 Alternative 2



Alternative 2

Alternative 2 would: (1) provide greater width to the Channel for buffer and (2) create a linear park along the Channel with "hard" and "soft" edges.

However, Alternative 2 would be (1) adjacent to Berry Street traffic and anticipated higher density development; and (2) offer restricted ability to create large embayments/peninsulas.

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Conclusion: The expansion of tidal wetland in this area could be done with a greater buffer from human activity, using the central portion of the China Basin Channel. This might encourage greater waterfowl use of this Channel. A major restriction is the narrowness of this area and thus, slopes would have to be steep, edge treatment primarily "hard," and the establishment of vegetation more difficult due to steepness of slope. It might be best to consider this side as more of a pedestrian walkway area, with recreational elements, while still providing a buffer from the central channel area.

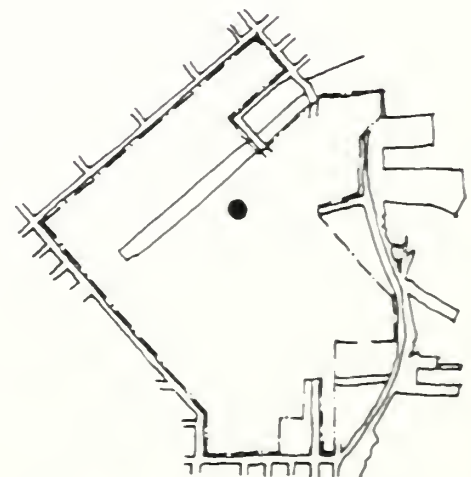
Habitat Size and Configuration: The current location of Berry Street and the China Basin Building property limit the size of this area to about ten acres. The most appropriate configuration would be narrow channels separating some low islands with more gentle slopes towards China Basin Channel. This would create a buffer for wildlife in the Channel.

2.9.4.3 Alternative 3

Alternative 3 would provide: (1) greatest flexibility for shape and configuration of wildlife area; (2) slope can be varied for various plant communities and shorebird feeding areas; and (3) it would be a protected area from waves and therefore suitable for marsh stabilization.

There could be (1) high human interference due to residential area nearby; (2) there would be a need to include the houseboat harbor; and (3) this location would require removal and replacement elsewhere of the large sewer box under Channel Street. Further, the central Channel will be a focal visual feature for Mission Bay and South of Market and it may be preferable to implement open space and/or water amenities there that are urban in character and of great visual quality all of the time.

Conclusion: This location offers substantial freedom in design features from small embayments to larger vegetated areas. It would be possible to consider vegetated marsh areas along the shoreline, buffered from human and pet intrusion by physical barriers, i.e., fences, or landscaped barriers. Soft edges could be more easily included here if greater buffer distance is



Alternative 3

2.9 Wetlands

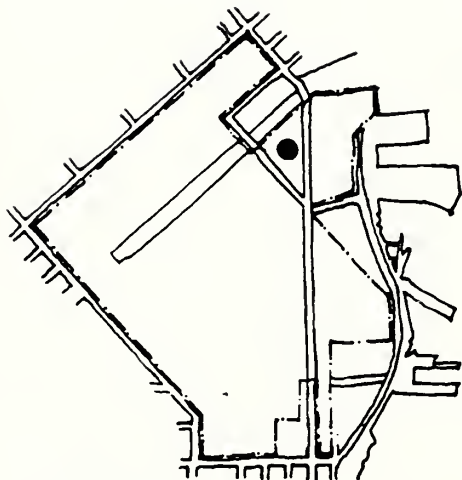
created. The creation of small tidal embayments that were exposed at low tide would attract substantial bird use and hence, human observation opportunities. Furthermore, marsh plant growth here would be more luxuriant due to the protected nature of the site and the reduced salinities due to runoff into the China Basin Channel.

Habitat Size and Configuration: Due to the flexibility of this portion of the site, high habitat quality could be created. If desired, up to 15 to 20 acres of tidal wetland could be created here with opportunities for human observation at various locations. Due to intense human use to the south, sufficient buffer zones would need to be created. A total of at least 24 acres would be needed, including buffer areas. An alternative would be to have a soft-edged water feature that invites wildlife but is not sized to encourage nesting.

2.9.4.4 Alternative 4

Alternative 4 is characterized by: (1) the opportunity for isolation from high residential densities; (2) good tidal circulation; and (3) the opportunity to provide a "theme" entrance to the site between Third and Fourth Streets.

However, (1) it would be adjacent to high traffic areas; and (2) the configuration would be limited by street alignment.



Alternative 4

Conclusion: This site, if fully developed as a tidal wetland park, could be well defined within and bordered by the street configuration. With the appropriate use of berms and vegetation, noise problems created by traffic on Third and Fourth Streets could be reduced. The location of the China Basin Building is a noise buffer from the traffic along the north side. The good tidal circulation would provide better water quality than in other portions of the site and enhance fish and food items for birds.

Habitat Size and Configuration: Both shoreline treatments and islands are possible at this location. It might be desirable to create a breakwater along the main channel to provide some protected water area within this site. Size would be about 10 acres.

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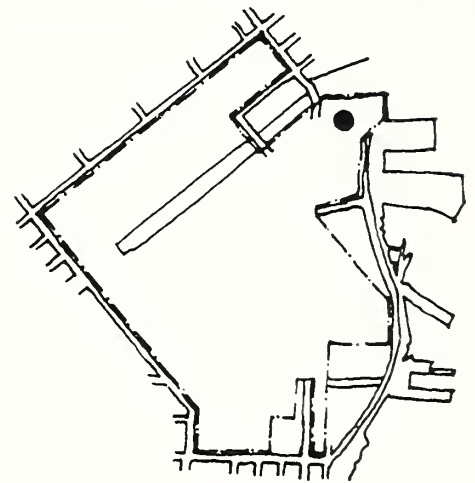
2.9.4.5 Alternative 5

Alternative 5 would have: (1) full connection with open water and Bay wildlife habitat; (2) greater isolation from human impacts than other sites; and (3) considerable flexibility for shape and configuration of a habitat area; but it would have a lesser role in bringing wildlife into China Basin Channel. Additionally, the Port's Master Plan calls for this site to be a container terminal (see 2.8.2).

Conclusion: From a wildlife perspective, this site would support the greatest amount of wildlife due to its isolation and proximity to the Bay. It would probably support greater fish and invertebrate use and have limited water quality problems.

Habitat Size and Configuration: A broad, vegetated wetland with some broad sloughs would provide the most protection for wildlife at this site. Islands would not be necessary, as human use could be minimized at this site. Size would range from about 15 acres to the entire parcel (20 acres) for optimal habitat.

Other opportunities exist to combine two or more of the above-mentioned alternatives, as is suggested in Section 4.



Alternative 5

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2.10 Housing

The following pages illustrate ways to create a residential neighborhood in Mission Bay. The rationale for the general approach, its relation to the historic neighborhoods of San Francisco, the ways in which housing in Mission Bay must respond to conditions which are different from those which created traditional neighborhoods, and considerations of cost and affordability have been discussed in previous Mission Bay reports. In this section, feasible housing types that produce desirable densities are presented. After housing types are described, ways of achieving various block densities and plans are illustrated. Alternate block plans then demonstrate how a mixture of housing types and lot densities could achieve block plans and block densities.

This section contains (a) planning criteria or assumptions used for the analysis of Mission Bay housing; (b) possible housing construction types that can be combined to create housing densities; (c) examples of ways to create housing density on blocks; (d) block plans each of one building type, and (e) mixed building type blocks, and (f) discussion of the houseboats and recreational boats within the Channel.

2.10.1 Assumptions

Studies summarized in the Background and Preliminary Findings Report and its San Francisco Housing Types supplements (November 1985) have given shape to a set of premises and assumptions for housing for Mission Bay. The following planning criteria are incorporated in the housing studies which follow:

Neighborhood Commercial: The new residential neighborhood must have a service and retail commercial element integrated within it. A combination of commercial space with recreational value next to open space may be of the greatest benefit. Good models for this neighborhood commercial sector are Clement Street or Chestnut Street with housing over continuous retail frontage although higher housing densities are expected in Mission Bay. The residential density for this

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mixed-use portion of the plan will be a maximum of 40 units/acre.

Family Housing: Some family housing is necessary and desirable in the Mission Bay neighborhood. Family housing in San Francisco is typically defined as three bedroom units with contiguous open space. Housing of this type can be built at a maximum of 55 units/acre. Combined with rental units in low-rise buildings, 70 units/acre are possible.

Neighborhood Open Space: There should be small public access mini parks and green urban squares within the residential neighborhood directly next to dwellings and internal to residential blocks but not a part of the private domain of residential developments.

Coverage: Not including the public open space described above residential buildings should not exceed the 75 percent lot coverage historically defined as a maximum by the San Francisco City Planning Code. Parking coverage, however, may exceed 75 percent below residential floors. Garage roofs in housing blocks would be designed for active use as open space. If garages are wood-frame, this could include planter boxes for plants. Concrete garages can be designed--albeit at considerable cost--to accommodate a layer of soil to allow full planting capability.

Building Heights: Housing structure heights will vary from three to eight stories. While the site could be covered with eight-story housing blocks, several factors suggest this is not appropriate: (1) a lower density San Francisco-type neighborhood is desirable; (2) taller buildings require high cost construction and more amenity to market, resulting in loss of affordability; (3) views from surrounding neighborhoods could be affected; and (4) the development could take on a monotonous character.

Buffering: Housing land use along heavily trafficked streets or next to industrial land uses must be buffered. Along busy streets, retail should be used on the lower floors instead of housing to buffer housing from the at-grade noise and visual impacts caused by traffic. Landscape elements, in an area set

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back from the street, should be used also to buffer at-grade uses.

Parking Ratios: Each increment of housing should provide covered parking at a ratio of one car per dwelling.

Perimeter Blocks: Housing which reconstitutes the character of traditional San Francisco neighborhoods must be of a perimeter block configuration with streets and public open spaces defined by continuous street frontages with frequent pedestrian access to buildings from streets.

Housing Design: Actual design and densities of housing will necessarily respond to market demand and amenities available.

Translation of these assumptions into realistic assessments that can be applied to the Mission Bay site leads to the use of combinations of the housing typologies and block patterns illustrated on the following pages. Any block can absorb some variety of the housing types described herein.

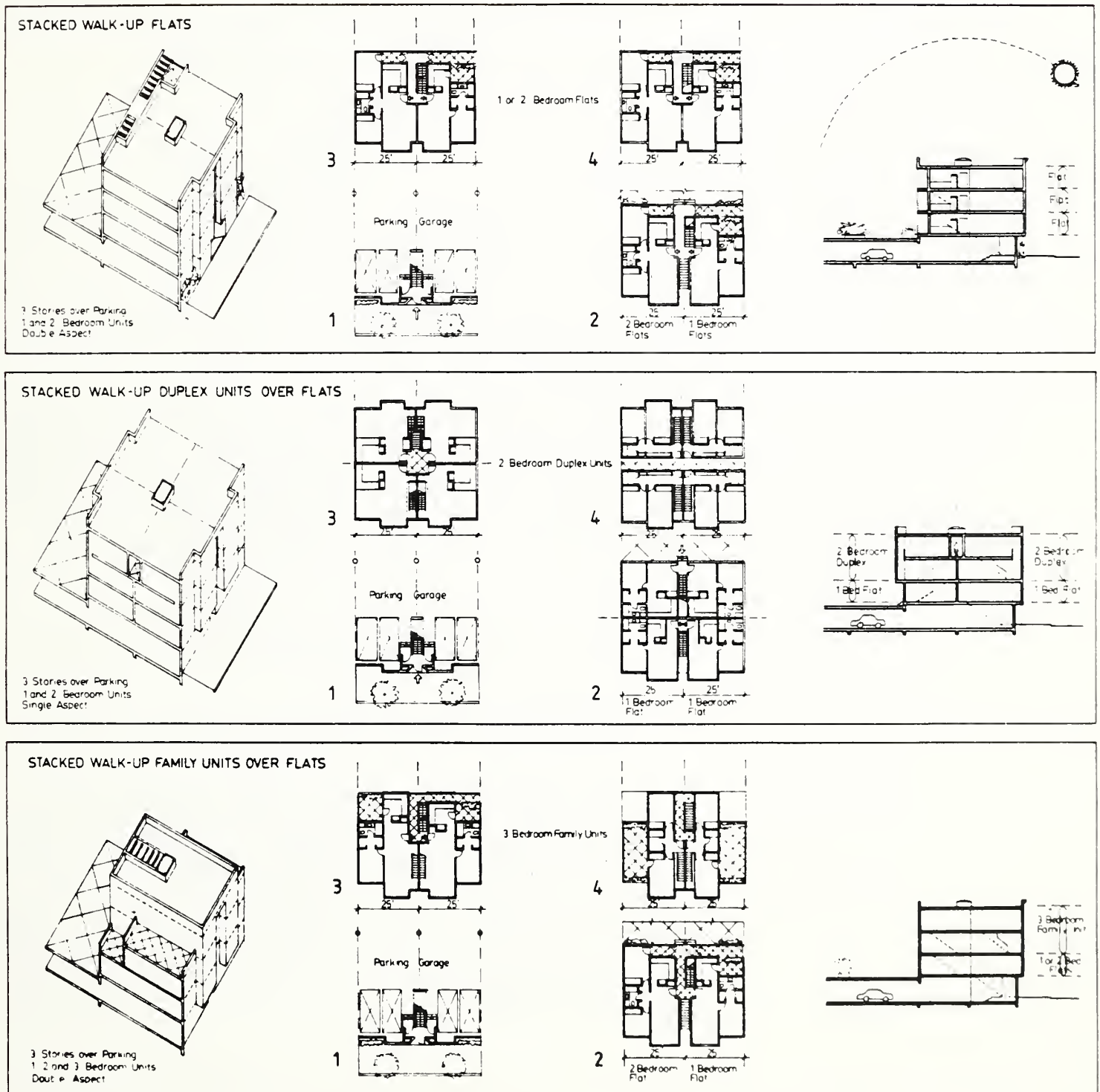
2.10.2 Housing Construction Types

2.10.2.1 Low-Rise Construction Types

The first of the low-rise construction types illustrated here is appropriate for areas of unstable soil south of China Basin Channel which have experienced uniform settlement, where soils can be compacted prior to construction. This type with three stories of housing over a parking garage can achieve moderately high densities (comparable to North Beach at its most dense, or Nob Hill) at relatively low cost and achieve the goal of creating a residential neighborhood in Mission Bay that has the scale and ambience of traditional San Francisco neighborhoods. The cost savings inherent in this construction type are the result of the following factors:

- o Foundation costs are relatively low, except where a structural slab with two-way beams is required.

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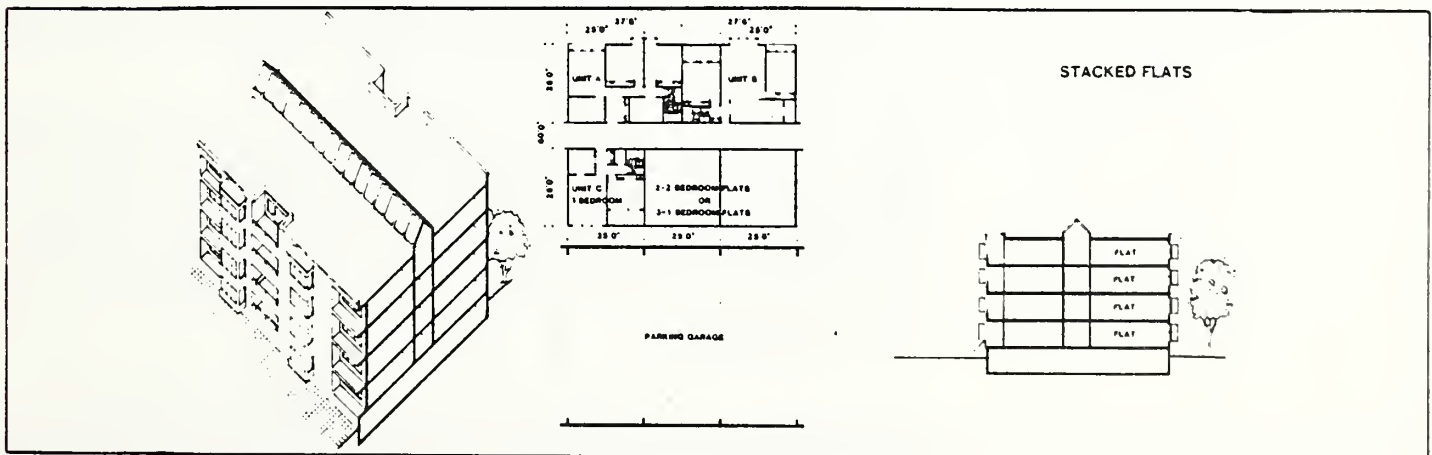
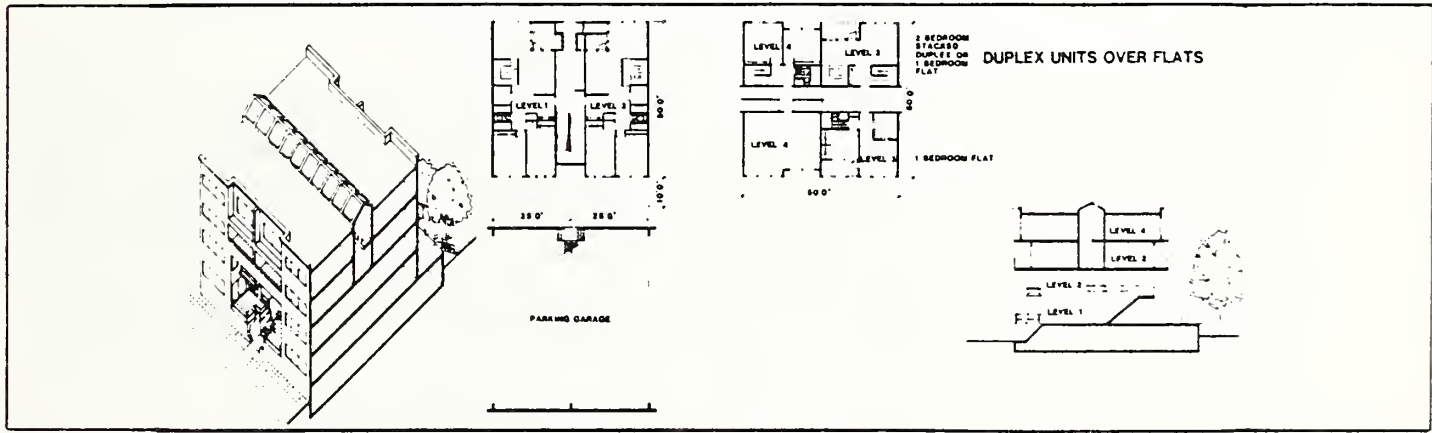
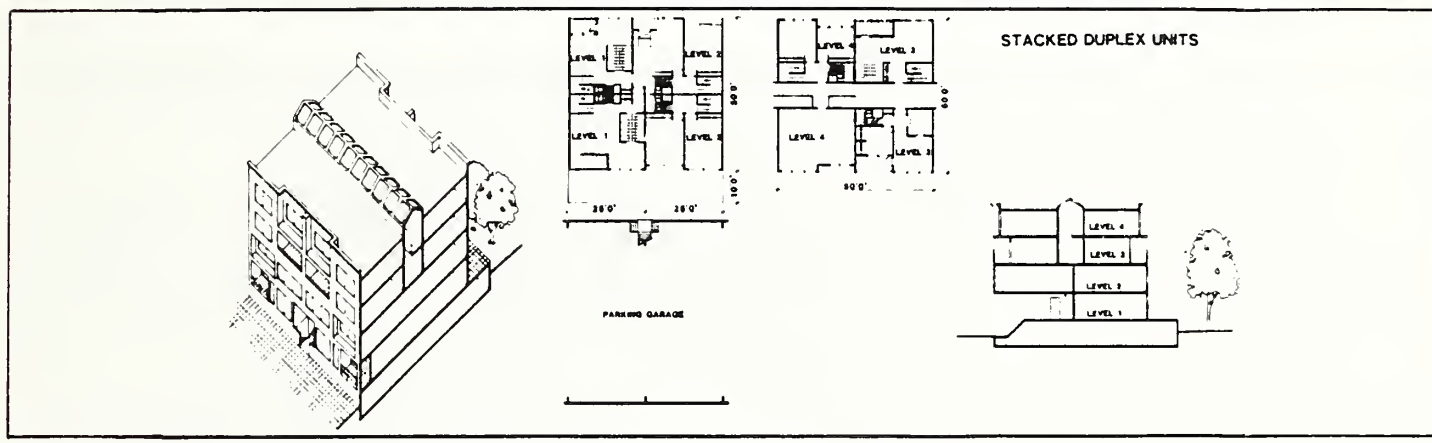
-
- o Aggregated parking in large wood-frame garages is both efficient and inexpensive to construct and garage roofs can be used for central open space, allowing active use by residents and plantings in planter boxes.
 - o Elevators are not required.
 - o Horizontal circulation is minimal and there are no corridors.

The potential advantages of this three-story construction type in terms of neighborhood quality are the following:

- o Buildings are less than 40 feet high, permitting courtyards and alleys to have the dimensions of traditional courtyards and alleys in the city.
- o The foundation type requires the parking garages to be located two feet below existing grade. This permits the first level of units to be approximately seven feet above grade. This height is advantageous for walk-up units and helps give a street quality analogous to Victorian houses rather than many recent apartment buildings which frequently have excessively high first floors.
- o Aggregated parking limits curb cuts and provides substantially more on-street parking than is typical of newer housing in the city.
- o Walk-up entrances provide an animated streetscape like that of traditional neighborhoods.

The second of the low-rise construction types is appropriate for area where low-rise housing is desired and the soils are inadequate to support the less expensive foundations already discussed. This applies to much of the site on which significant differential settlement of the soils is likely to occur after construction. This construction type would have many features in common with the first, as it would have wood-frame housing over a garage covering the entire site. The major differences are the following:

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2.10 Housing

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- o Foundation costs are higher, as piles are required.
 - o Concrete garages are more expensive, but allow greater flexibility in construction and plantings on garage roof tops.
 - o Four stories of wood-frame housing can be accommodated, allowing slightly higher densities. Elevators could be required, which add to cost but offer greater amenity and accessibility. A two story townhouse on the uppermost floors would eliminate the elevator requirements.
 - o Greater structural stability could be achieved.

2.10.2.2 Mid-Rise Construction Type

The mid-rise construction types following is appropriate for most of the area north of China Basin Channel and potentially a portion of the land south of the Channel, especially where differential settlement of soils will occur. This type combines midrise construction with low-rise construction like some other recent San Francisco projects (see San Francisco Housing Types). It assumes pile foundations and concrete garages.

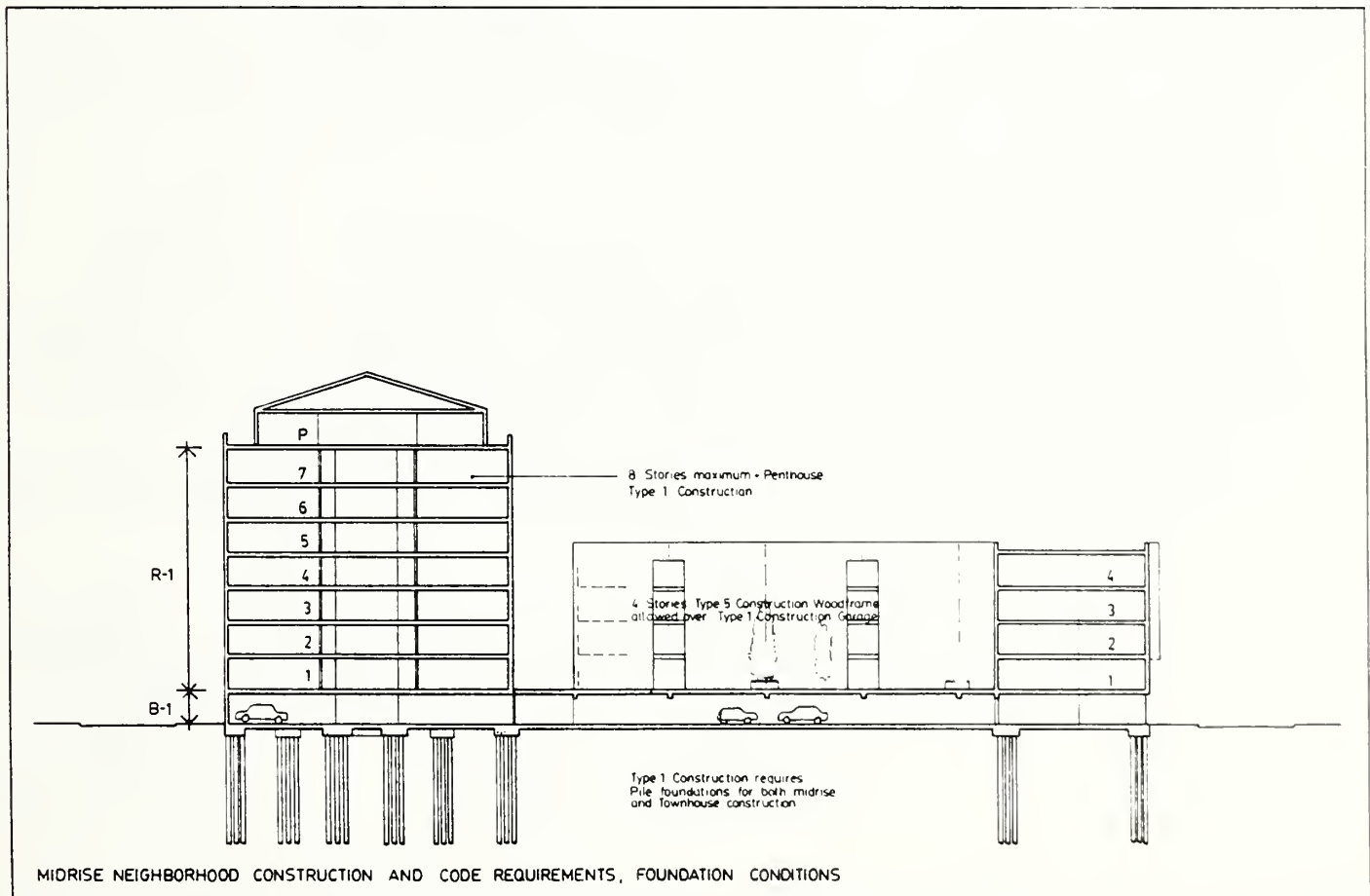
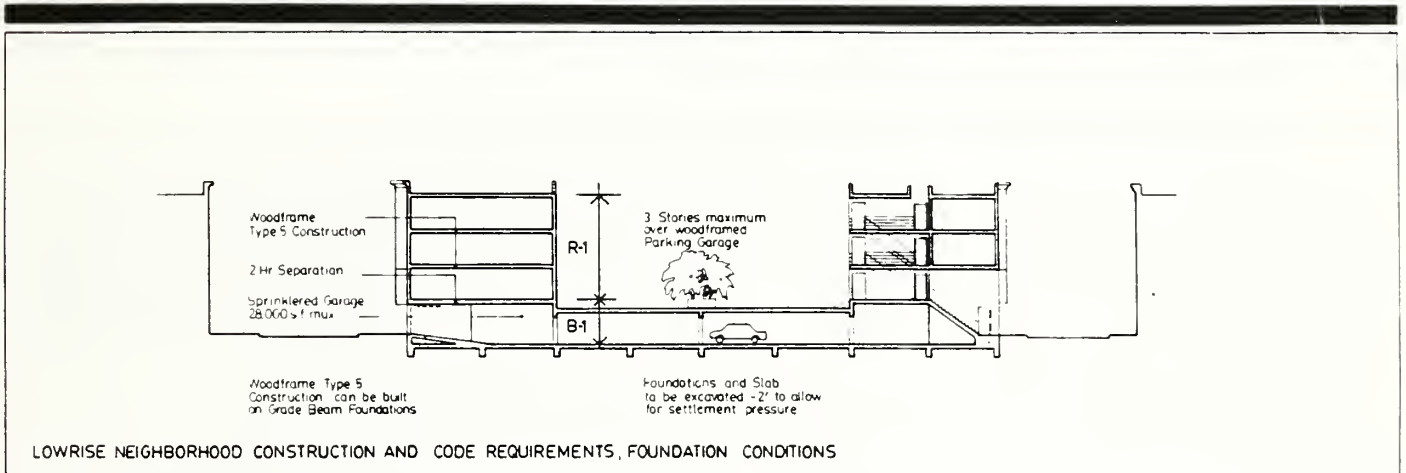
2.10.2.3 Other Construction Types

There are other potential housing configurations not illustrated here which may have applicability to Mission Bay. Other types include the following:

Two- and three-story wood frame housing with open parking at 45 units/acre. This configuration is the basic type in the Western Additional Redevelopment Area and several recent affordable projects in the City are of this type. The current plan alternatives assume that the 45 units/acre density is too low for Mission Bay and that open parking lots will be unacceptable.

All midrise. It may be desirable to build to the absolute maximum density achievable within the eight story height limit for limited portions of the site. This would imply an all

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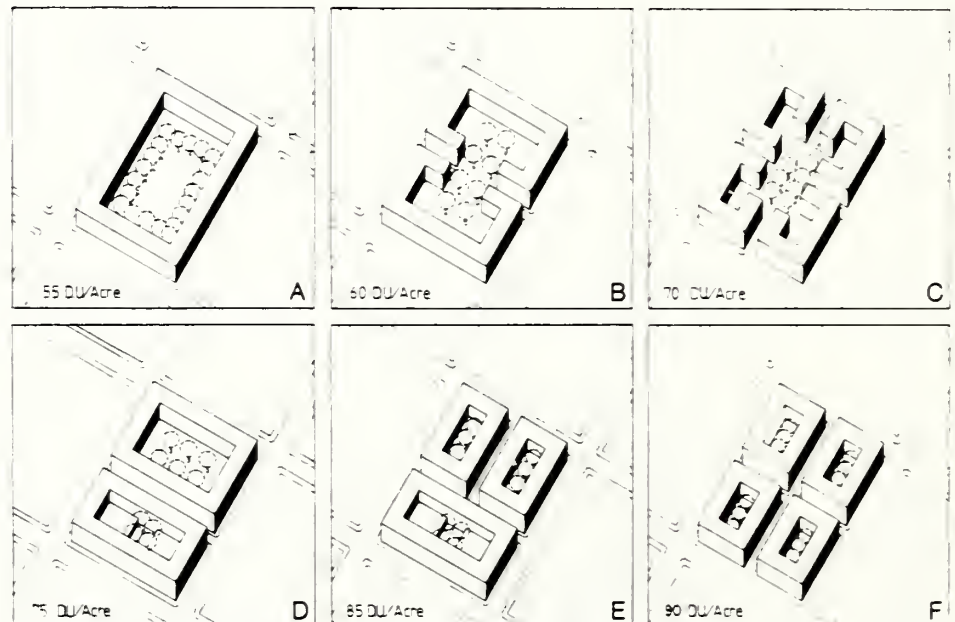
midrise scheme with two levels of parking at approximately 150 units/acre.

Mixed Use. Housing on two to four floors over office floors and/or retail and parking is an optional, more complex construction type. It could have limited applicability on the site, because of its unique siting criteria and more complex and therefore costly operational characteristics. In particular, separate horizontal and vertical circulation for housing and office uses is a typical operational requirement.

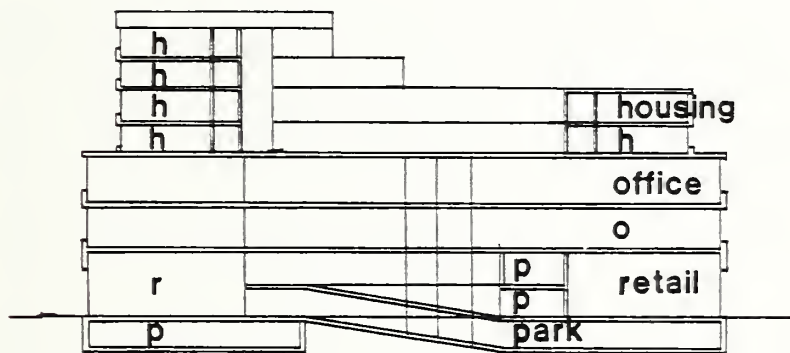
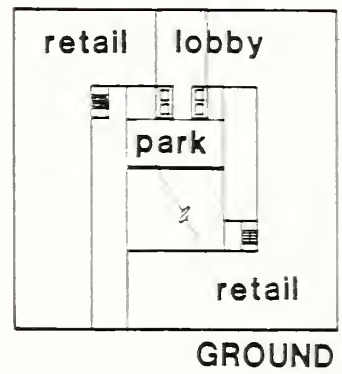
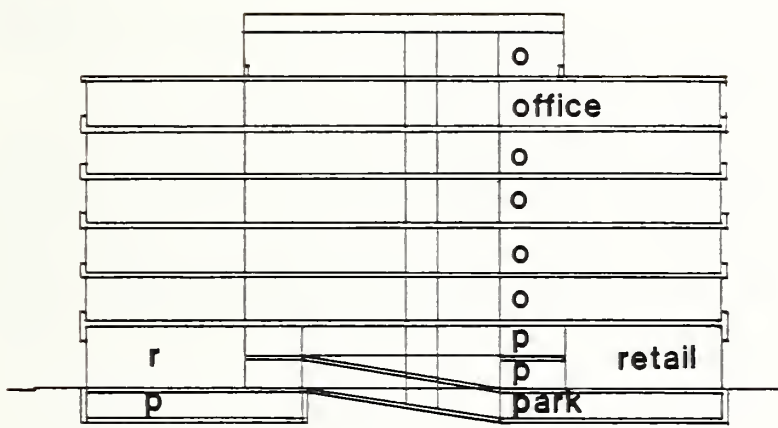
2.10.3 Alternatives for Maximizing Density

2.10.3.1 Density Studies

The illustration below shows a basic method for obtaining maximum densities with low-rise housing types. The sketch (A) showing 55 dwelling units/acre shows a basic perimeter housing



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block with three stories of housing over parking. Assuming 850 square foot units and 1:1 parking, the density of this configuration would be 50 units/acre. The subsequent sketches show how increasing the perimeter of the block by subdividing it with alleys would increase this basic density. Pushing this principle to the maximum density with the criterion of 75 percent maximum lot coverage would create the pattern shown at the lower right (F) which contains 90 units acre and a sub-scale of residential alleys similar to older San Francisco neighborhoods. As densities increase, views and natural light are constrained, especially for units fronting on alleys. These densities are based upon an 850 square foot average unit size with no provision for family housing or neighborhood commercial.

The basic low-rise housing types shown in Section 2.10.2.1 typically accommodate 85 units/acre. Family units, luxury townhouses and housing combined with retail have lower densities. The relative quantities of these housing types can only be determined based on a particular landuse plan, so it is important to express the density of the low-rise neighborhood at a range of 78-85 units/acre at this stage. Optimum densities, then, can be expressed as follows:

South of China Basin Channel	78 to 85 dwelling units/acre optimal density
North of China Basin Channel	120 dwelling units per acre optimal density

These densities would be lower wherever ground floor retail is part of the building program. Also, it is possible to revise these figures upwards if one makes optimistic assumptions about the future ability and willingness of San Franciscans to pay relatively high prices for housing in Mission Bay or about the creation of future housing subsidies which do not now exist. Prices would be higher because higher densities require

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disproportionately higher construction costs. If you make these assumptions, densities could be as follows:

South of Channel	65 percent at 72 to 80 dwelling units/acre
	35 percent at 120 dwelling units/acre

North of Channel	150 dwelling units/acre
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The diversity of housing desired within Mission Bay, including price, tenure, accessibility and adaptability will be in future phases of this work. The Departmental goals are in the Objectives and Policies report, and will be refined as planning continues.

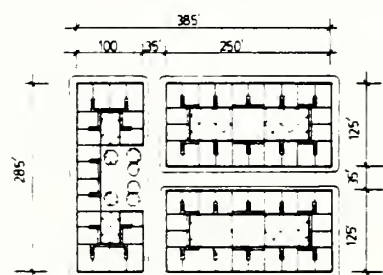
2.10.3.2 Alternate Block Plans

A variety of block plans is possible. If, for example, a 385-foot X 285-foot block module were used, it would be flexible enough to suit a variety of housing layouts at the desired low-rise neighborhood density of approximately 85 du/acre. It could accommodate stacked walk-up flats, townhouses, corridor access units, amongst many others. Alleys could run in both directions. Small midblock public open squares could also be created. The following nine block layouts suggest a range of layouts possible for this one block module. The alleys would allow on-street parking for visitors. They also would recall the pattern of many San Francisco neighborhoods. Four blocks could be arranged to create a public square or neighborhood park where they intersect by omitting a part of the block. (See block layouts.)

2-56 PLAN DETERMINANTS

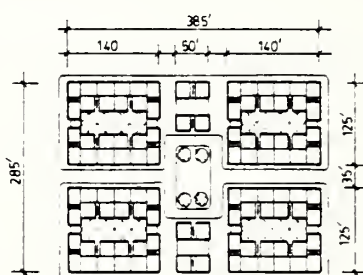
2.10 Housing

BLOCK TYPE 1



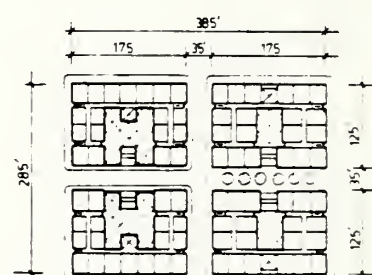
STACKED WALK-UP FLATS OR FAMILY UNITS
55-85 DU/AC

BLOCK TYPE 2



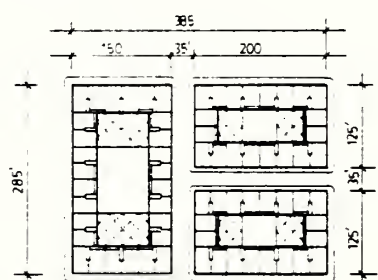
STACKED WALK-UP DUPLEX UNITS AROUND COURTS
85 DU/AC

BLOCK TYPE 3



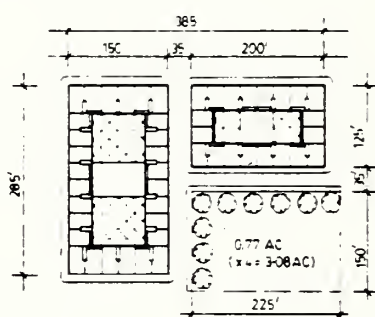
ELEVATED ELDERLY PERSON UNITS OR DUPLEXES
55-85 DU/AC

BLOCK TYPE 4



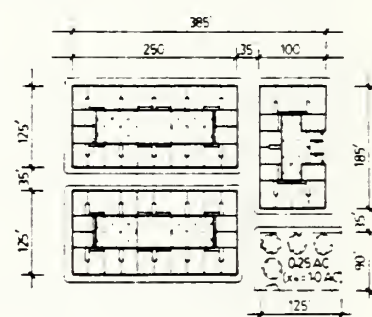
STACKED WALK-UP FLATS OR FAMILY UNITS
55-85 DU/AC

BLOCK TYPE 5



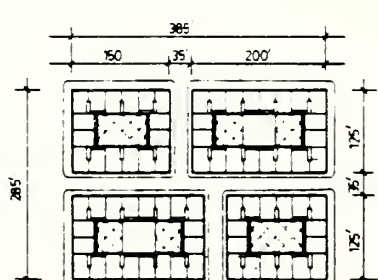
HOUSING AROUND LARGE NEIGHBORHOOD SQUARE

BLOCK TYPE 6



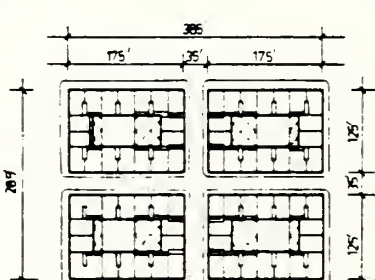
HOUSING AROUND SMALL NEIGHBORHOOD SQUARE

BLOCK TYPE 7



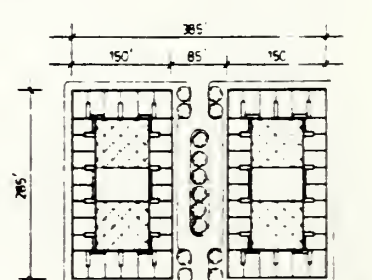
STACKED WALK-UP FLATS OR FAMILY UNITS
55-85 DU/AC

BLOCK TYPE 8



STACKED WALK-UP FLATS OR FAMILY UNITS
55 DU/AC

BLOCK TYPE 9



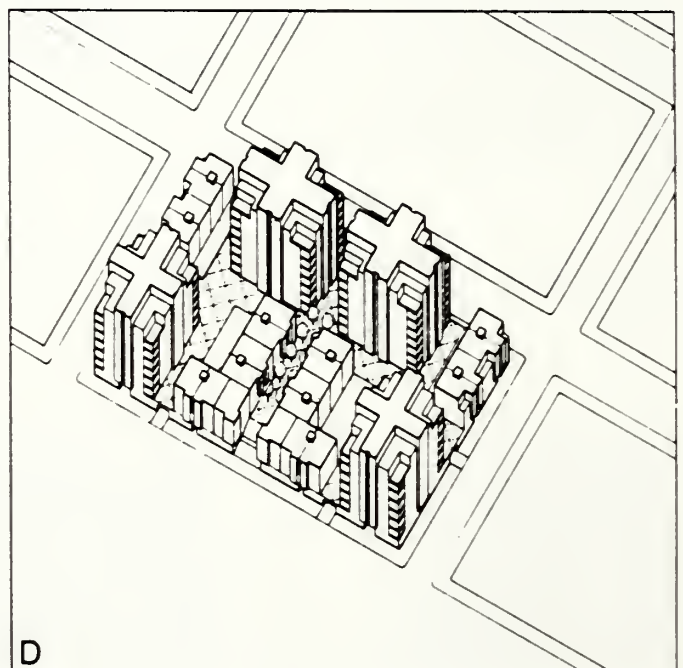
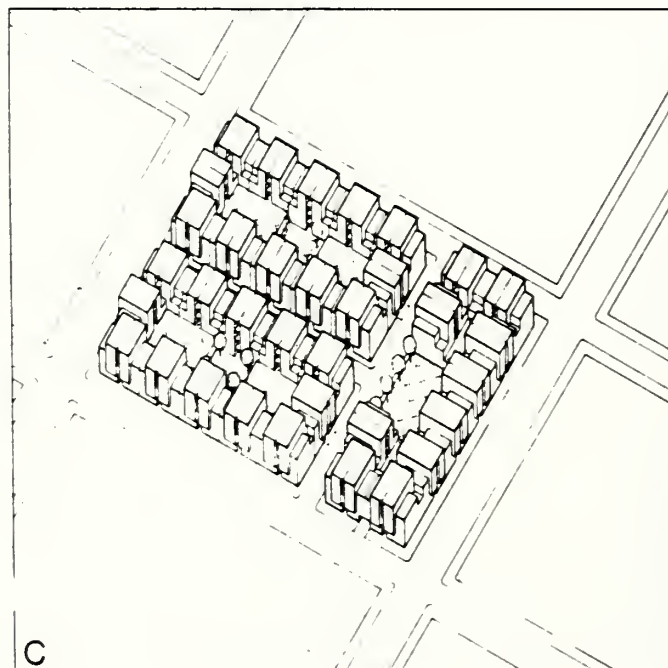
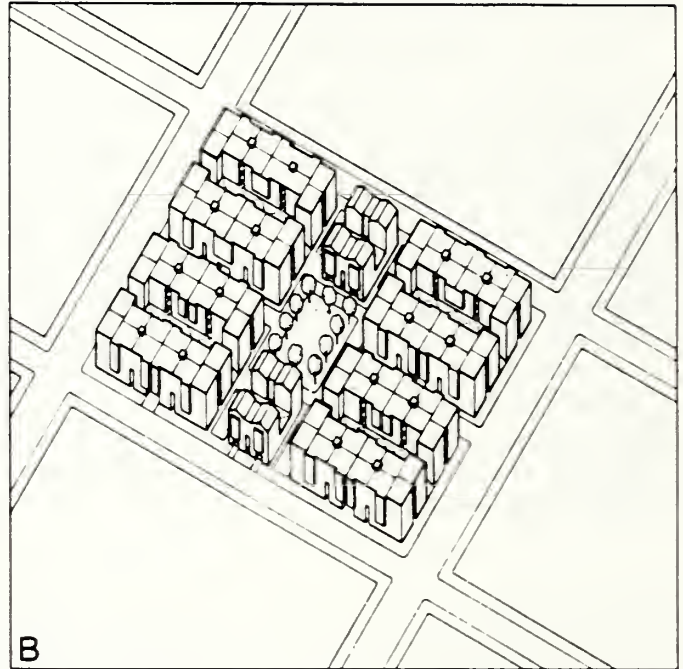
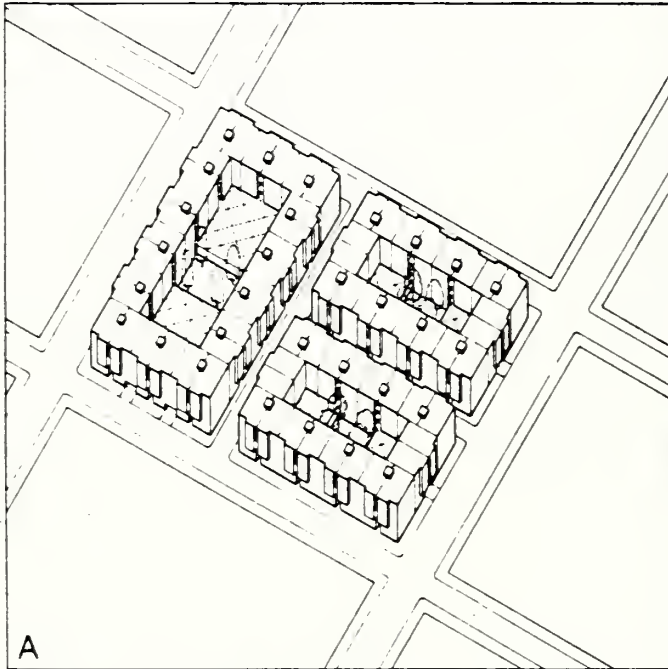
STACKED WALK-UP FLATS OR FAMILY UNITS
45-75 DU/AC

2.10 Housing

Using a mixture of housing construction types and a mixture of housing densities within a block, more variations are possible. The following illustration demonstrates four means of varying housing types and densities to achieve alternative block plans. Type A shows 216 stacked walk-up flats at 85 dwelling units per acre. There will be 216 covered parking spaces and approximately 90 on-street-parking spaces. Type B is based on duplex walk-up units over flats and has the same density as Type A. Type B includes a 5,500-square-foot public mid-block mini-park. Type C has walk-up family units over flats. There are 148 units at a density of 55 units per acre. Block D shows a combination of mid-rise and low-rise buildings at a density of 120 dwelling units per acre. A block 385 feet x 140 feet or 2.12 acres, accommodates 264 units. As planning progresses specific blocks will be planned using these various housing types and densities.

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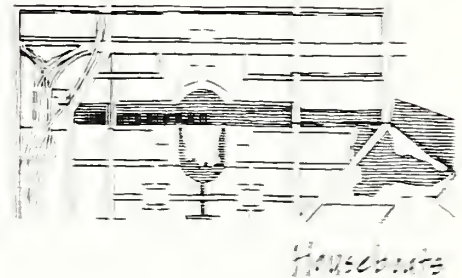
2.10 Housing



2.10 Housing

2.10.4 Houseboats and Boats

At present, approximately 20 houseboats and 35 recreational boats occupy slips within China Basin Channel (Mission Creek). They are members of the Mission Creek Harbor Association and occupy this area under an agreement with the Port. The Port has a permit from the Bay Conservation and Development Commission (BCDC) for a harbor including 20 houseboat berths. The houseboats and recreation boats could remain in their present location, be moved to a new location in the Channel or be displaced from the Channel.

**2.10.4.1 Present Location**

The present dock on the south side of the Channel extends from west of Sixth Street to a point midway between Fourth and Sixth Street. The dock is periodically maintained by the Harbor Association with substantial improvements requiring regulatory agency permits. The Channel is maintained by the Coast Guard as a navigable waterway. The houseboats and boats in their present location would occupy the area of the primary and central open space amenity for the Mission Bay site. Improvements being considered along the Channel could contrast sharply with the visual and functional characteristics of this small community. A bridge providing a southerly extension of Sixth Street would be precluded by retention of the existing configuration.

2.10.4.2 Relocated Or Reconfigured Community

Substantial social and economic costs are likely if the houseboat/boat community is relocated or reconfigured within the site. Any change in location or configuration is expected to require an amendment to the BCDC permit for the harbor. Such an amendment would carry with it a requirement that the present permanent permit be cancellable at about 5 year intervals. Such a cancellation clause could make financing and improvement difficult and could undermine the security of the present residents.

At present, the Channel is an amenity known primarily by these houseboat/boat owners and their friends and associates.

2.10 Housing

The intention of this planning process is to create an amenity at the Channel for everyone. If the harbor is to remain in its present extent, location and configuration, efforts must be made to assure that this harbor is attractive and a benefit to the new development.

2.10.4.3 Displacement of Recreational Boats

The proposed Mission Bay Objectives and Policies state that the Department intends to "Incorporate the existing houseboat community in the new development." (Objectives and Policies, page 3.) Displacement of houseboats, those boats on which people reside and which have registered sewer hookups, is not being considered. It is possible, however, that recreational boats may be displaced and/or relocated to other marina facilities outside the Channel. Further investigation is required to determine whether a reduction in harbor size would alter the status of the present permit and make it cancellable.

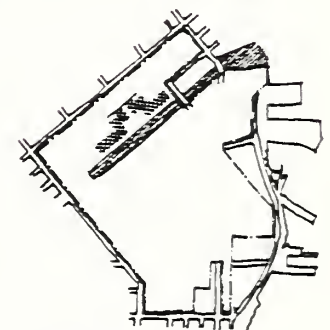
2.11 Retail Siting Requirements

2.11 Retail Siting Requirements

Retail uses take a variety of forms. In a neighborhood context, numerous personal services, retail shops and eating and drinking establishments are frequently aggregated and used by pedestrians from nearby homes. At a larger scale, retail uses can be combined with community facilities used by several neighborhoods or cultural facilities enjoyed by residents citywide. Also, open space amenities adjacent to retail, especially eating and drinking establishments, may add value to all such uses.

2.11.1 Retail North of the Channel

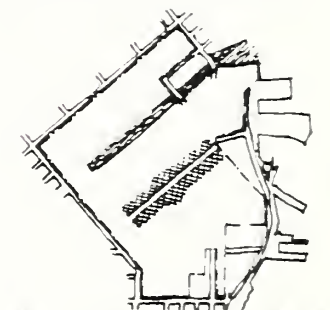
Since China Basin Channel is one of the most unique features of the site and in order to take advantage of its potential for amenity and centrality, some retail activity would be best located along its northern edge. Restaurants would have exposure to the sun and water. Shops could open onto pedestrian walks and retail uses could be mixed with many land and water related uses.



Retail North of Channel

2.11.2 Retail Along a Neighborhood Street

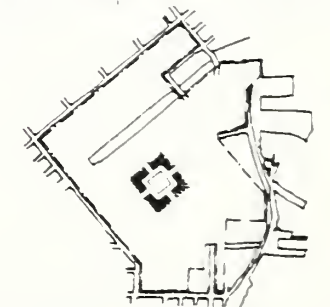
In the tradition of many San Francisco neighborhoods, retail uses at the ground level of a neighborhood street would create a delightful mixture of shops, restaurants, personal or business services, dwellings and community facilities. Retail street frontage, open space, community and cultural facilities and housing could be combined along a central neighborhood spine. Such retail is often on a transit street.



Retail-Neighborhood Street

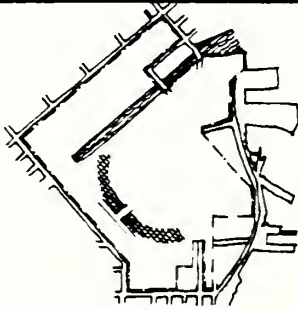
2.11.3 Retail Around a Neighborhood Square

Separate or in conjunction with a neighborhood street, retail uses could be located around a neighborhood square. As in other places in San Francisco, shops and restaurants could spill out onto a square or into an arcade at the edge of a square. A series of squares of different sizes along a neighborhood retail spine with housing, community and cultural facilities and open spaces could be combined along an urban street.

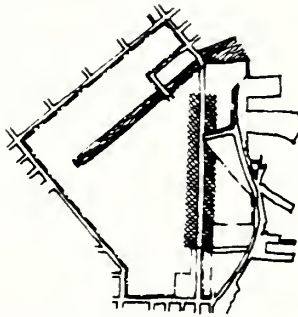


Retail-Neighborhood Square

2.11 Retail Siting
Requirements



Retail-Linear Open Space



Retail-Arterial Street

2.11.4 Retail Along a Linear Open Space

Retail spaces can be located along a linear open space in combination with housing, community facilities and all the amenities of landscaping and canals. With good public and automobile access to the retail uses, the neighborhood retail can have both the environment of a park and the access of a street.

2.11.5 Retail Along an Arterial Street

In many part of San Francisco retail uses are located along major arterial streets, but the environment created is not the most suitable for neighborhood retail. For instance, if there were retail uses along Third Street, the truck and automobile traffic would be too noisy and dirty for any of the retail activities to have outdoor activities. It would not be a pleasant pedestrian environment and higher speed traffic would discourage on-street parking. However, it would buffer housing from heavy traffic.

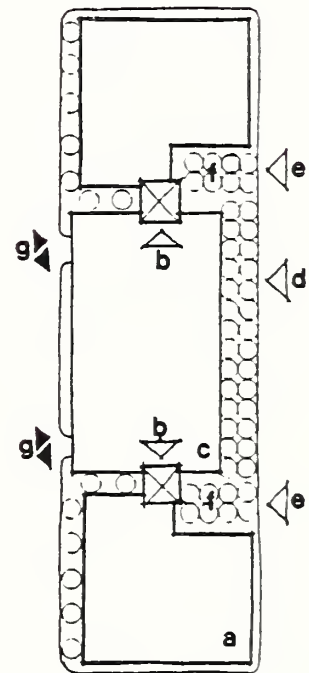
2.12 Secondary Office

2.12 Secondary Office

2.12.1 General Characteristics

The prototypical characteristics of secondary office buildings determine appropriate locations on the site for such buildings. Those siting criteria are:

- o Predominantly eight-story building heights are required, with opportunities for retail uses at street level.
- o Office sites should be completely accessible by public transit and accessible from Downtown and residential areas. Heavy traffic can be tolerated.
- o Open space and setbacks in office blocks should include varying sizes of parks as usable open space. Secondary open space can be plazas and building setbacks. Landscaped alleys would be used as pedestrian circulation and for retail accessibility.
- o Siting of offices should occur adjacent to other offices or retail uses. Direct linkage to water features and China Basin Channel as well as views of downtown are desirable.
- o All parking should be in structures of no more than six stories.
- o Open space associated with office uses would occupy about 25 percent of office sites.
- o Large floor areas, such as 40,000 square feet, should be provided.



- a. Secondary office buildings
- b. Vertical circulation and connection between parking and office buildings
- c. Parking structures - limited parking for key personnel
- d. Muni stop
- e. Public entrance
- f. Open space at building entry
- g. Access to parking garage

2.12.2 Site-Specific Determinants

The north of Channel area is appropriate for office uses for the above-mentioned reasons and because office development would benefit from the boulevard concept on King Street using landscaped setbacks for buildings, as well as pedestrian circulation. Courtyards could open up from this linear parkway

2.12 Secondary Office

as entranceways to buildings. Also, this area could be completely accessible for pedestrians from Mission Bay housing, for Muni riders if stops are located along King or Townsend Street.

The area adjacent to the I-280 interchange would be appropriate because of proximity to Showplace Square and Muni stops on King Street. Parking structures could be located within one block. Offices could share parking facilities with nearby R&D.

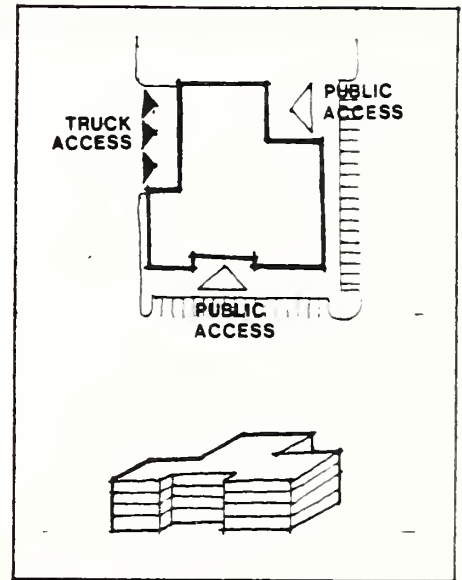
2.13 Research and Development (R&D)

2.13 Research and Development (R&D)

2.13.1 General Characteristics

Several types of R&D buildings would be most appropriate in Mission Bay. Their siting characteristics shared by all suitable types include:

- o Height: higher ceilings on first floors, four-story (45-foot) maximum building height
- o Public accessibility and visibility
- o Traffic access pedestrian and vehicular
- o Open space: about 13 percent of each site
- o Setbacks: landscaped areas along street
- o Parking: majority of parking in structures, some on grade



Large Scale R & D

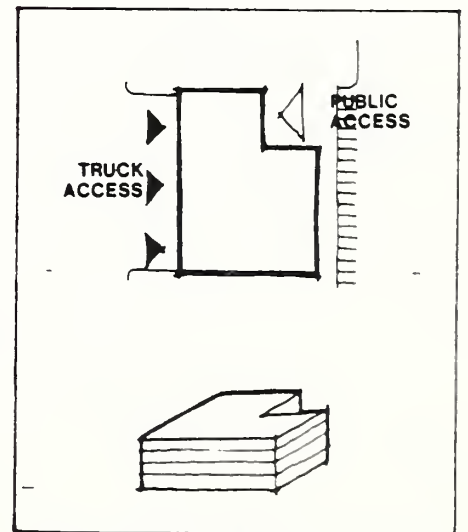
2.13.2 Alternative R&D Uses

2.13.2.1 Large-Scale Retail, Wholesale, R&D

- o Height: four stories (45 feet)
- o Major public access: car, public transit, pedestrian
- o Limited truck access
- o Public open space: parks and plazas
- o Setbacks: generous, landscaped areas at streets

2.13.2.2 Light Industrial, R&D

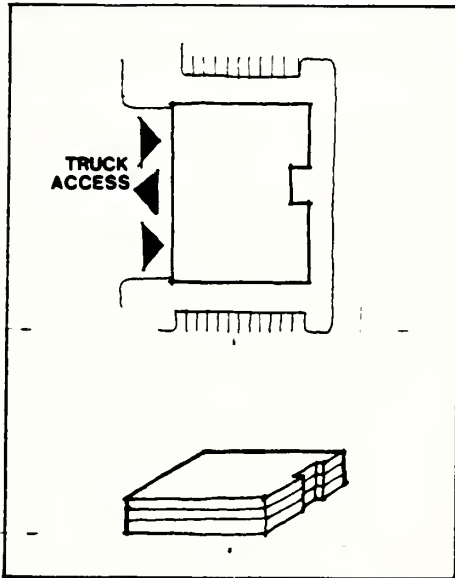
- o Height: up to four stories (45 feet)
- o Some public access: car, public transit (employee and public visitors), pedestrian (employee and visitors)



Light Industrial R & D

2-66 PLAN DETERMINANTS

2.13 Research and Development (R&D)



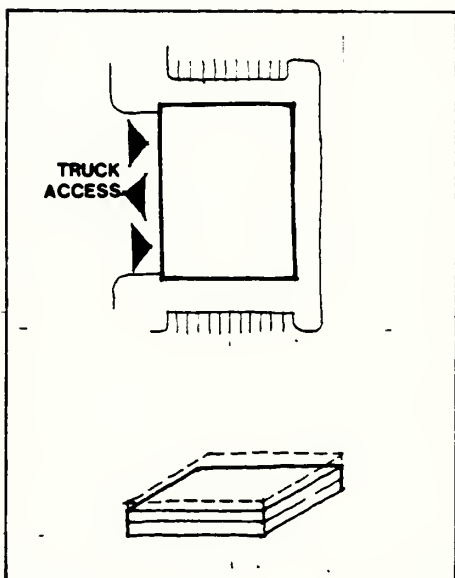
R & D Only

- o Minor truck access
- o Some public open space at buildings, major open space centrally located in R&D area
- o Setbacks: landscaped setbacks at streets

2.13.2.3 R&D Only

- o Height: up to three stories (35 feet)
- o Limited public access: cars, public transit (employees, visitors)
- o Truck access for semi-trailers
- o Limited public open space at building, major open space centrally located in R&D area
- o Setbacks: combination of building setbacks and street trees

2.13.2.4 Maritime, R&D



Maritime / R & D

- o Height: up to three stories, preferably three (35 feet)
- o Limited public access: cars, public transit (employees); limited pedestrian access
- o Truck access for semi-trailers
- o Some opens space near building. Major open space centrally located
- o Setbacks: limited building setbacks and street trees

2.13.2.5 Light Manufacturing and Warehousing

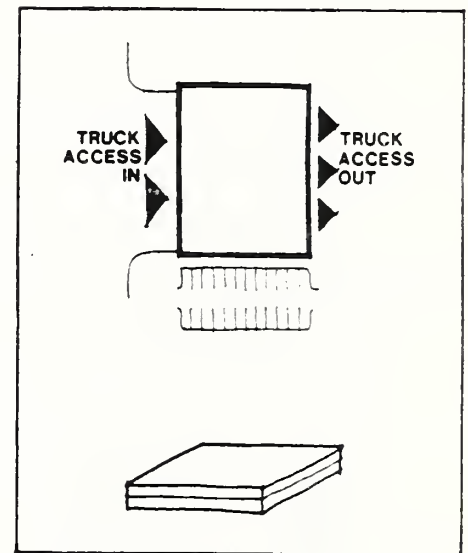
- o Height: up to two stories (25 feet)
- o Very limited public access: cars, public transit (employees)

2.13 Research and Development (R&D)

- o Major truck access for semi-trailers
- o Open space to be located centrally to serve all R&D areas
- o Setbacks: small setbacks and street trees

2.13.3 Site-Specific Determinants

In San Francisco, it may be necessary to incorporate reduced FARs and some surface or non-structured parking on-site to compete effectively with suburban R&D sites. The largest single parcels for R&D use exist south of Sixteenth Street; they can accommodate several types of (campus) site layout, depending on use. There would be direct access from I-280 providing easy access for trucks. Of all Mission Bay, this area has most direct linkage with the existing industrial area. Some facilities such as parking may be shared.



Light Manufacturing

The land adjacent to I-280 is in a narrow parcel due to railroad tracks, Muni tracks, and the existing Owens Street right of way. The resulting depth of lot is approximately 100 feet. There are good lots for smaller users of R&D space. In this location, building heights of four stories (40 to 45 feet) are desirable since the freeway is 40 feet high.

The odd-shaped parcels at Townsend, King and Seventh Streets caused by any I-280 freeway ramp solution could be used for wholesale uses like those in the adjacent Showplace Square.

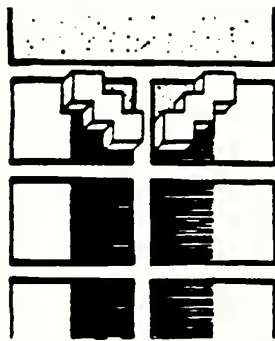
2.13.4 Land Use Compatibility with R&D

R&D varies by use characteristics and degree of land use compatibility. The range of R&D types extends from RD-1, resembling secondary office, to RD-5, more like a traditional land use. RD-1 typically has less associated truck traffic and more building height, landscaping and public access. RD-5 usually has associated truck traffic, less landscaping and public access. The diagram summarizes R&D land use compatibilities. While not reflecting absolute distinctions (since hazardous materials are not compatible with any use), they provide a common sense guide for siting R&D.

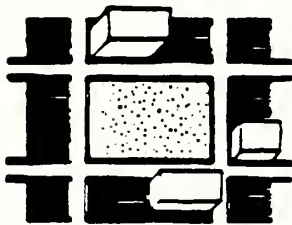
	RD 1	RD 2	RD 3	RD 4	RD 5	RETAIL	COMMUNITY	HOUSING	OPEN SPACE
RD 1	●	●	●	●	●	●	●	○	●
RD 2		●	⊗	⊗	●	⊗	⊗	⊗	●
RD 3			●	●	●	⊗	⊗	⊗	●
RD 4				○	⊗	⊗	⊗	⊗	○
RD 5					⊗	⊗	⊗	⊗	⊗

● COEXIST
 ○ COMPATIBLE/ADJACENT
 ⊗ COMPATIBLE WITH BUFFER
 ⊗ NOT COMPATIBLE

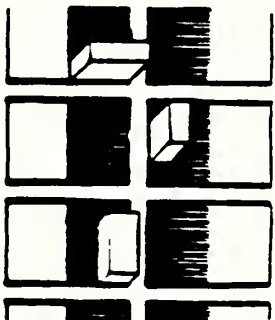
2.14 Community Facilities



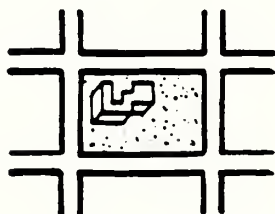
Transition Zone



Town Square



Main Street Corridor



Neighborhood Park

2.14 Community Facilities

2.14.1 General Location Concepts

Community facilities may be located in a mixed-use zone, combined with housing, commercial or office uses. They may also be located in an institutional zone, which restricts other uses. Some uses can be combined within a neighborhood center; others require separation. Combination of several community facilities within one building can provide economical space use and flexibility as needs of the population change. Generally police and fire can combine in one type of shared facility, and other uses in this section in another type. Community facilities can be located according to four basic concepts.

- o Transition Zone—Community facilities can be located in transitional zones, creating a focal point between major land uses.
- o Townsquare—In this concept, community facilities are located in a mixed-use zone, around a central plaza shared by several neighborhoods.
- o Mainstreet Corridor—In this case, community facilities are distributed along with a main commercial street interspersed with other uses and would be very transit accessible.
- o Neighborhood Park—Community facilities can be decentralized, located in small parks serving about 1,500 households each. This is an especially appropriate arrangement for childcare facilities.

The plan may fix the location of specific community facilities, or leave the designation flexible. The needs of the Mission Bay community will change over time, so flexibility in addressing those needs is important. Detailed location criteria for each of the community services are shown on the following chart. Not all of the services for which information is provided below will necessarily be located on this site. Further analysis

2.14 Community Facilities

focused on actual site-specific needs will be required before settling on a program for community services.

Location Criteria for Community Facilities

	Fire	Police	Schools	Public Health	Public Safety	Child Care	Cultural Arts	Religious Facilities	Libraries	Multi-Service Community Center, Recreational Fac.
1. Near Housing			●			●		●		●
2. Away From Housing	●	●								
3. Security/Noise Buffer Required	●	●				●				
4. Near Public Transit		●	●	●		●	●	●	●	●
5. Near Shared Parking							●	●		
6. Near Major Intersection							●	●		
7. Near Major Artery	●			●			●			
8. Two Street Access		●					●			
9. Not on Busy Highway	●	●				●				●
10. Away From Major Streets										
11. High Visibility		●					●			
12. High Imageability							●			
13. Near Commercial Areas	●					●	●		●	
14. Near Nighttime Amenities							●			
15. Air Rights Okay	●		●	●						
16. Central to Adjacent Communities	●	●			●		●			
17. Near Other Community Facilities			●	●	●	●			●	●
18. Decentralized						●		●		
19. Near Large Open Space			●				●			

2.14 Community Facilities

Facilities for recycling, including "Buy-Back" centers which occupy parking stalls and drop-off bins in multi-family buildings, can occur in a variety of locations.

2.14.2 Fire Station

The San Francisco Fire Department completed a Fire Station Location Project in 1984. The study used computer modeling techniques to analyze alternative site configurations for strategically locating fire suppression resources in the City. Based upon this study and other considerations, the San Francisco Fire Department is planning to close the station at Third and Bluxome. Equipment and personnel will be relocated to the presently-vacant station at 1300 Fourth Street which is in Mission Bay. The Fire Department anticipates renovating and occupying the vacant building during the next three years. The Fire Department, however, would consider transferring its needed facilities to a new location in Mission Bay.

2.14.2.1 Physical Components

The key concept in planning a firehouse is achieving the shortest turnout time possible. This requires grouping various functional spaces so that movements to exit from the firehouse are minimized.

2.14.2.2 Size

Building: 12,000 square feet. A single story is preferred, however, 2,000 to 3,000 square feet may be on an upper level.

Outdoor Training Area: 8,000 square feet.

Minimum lot size: 1300 Fourth Street site, about one-half acre.

2.14 Community Facilities

2.14.2.3 Location Criteria

- o Primary service area within 1/2 mile radius.
- o Streets close to, and leading to major thoroughfares.
- o No topographic barriers within the primary service area.
- o Near high population density or commercial areas, away from low density residential.
- o Minimum building setback: 30 feet. Sixty (60) feet is preferable.
- o Located on most stable land for earthquake safety and to maximize ability to respond in emergencies.
- o Main arterial location to be at least 50 feet wide to accommodate hook and ladder truck.
- o Avoid low sun orientations at fire truck doors for swift and safe equipment exit.
- o Air rights should be considered in high density locations.

2.14.3 Police

The existing Southern Station location in the Hall of Justice is inadequate today. With the new 1,200 residential units planned for South Beach, and an anticipated large residential neighborhood in Mission Bay, a new location for the Southern Station will be required.

2.14.3.1 Physical Components

The Southern District Station would contain the following components: neighborhood-related services; district command facilities; district patrol administration and communication; suspect booking and detention; walk-in service and information; storage for police vehicles and equipment; briefing, locker and deployment center for police personnel; training, physical fitness and pistol range facilities; interview rooms;

2.14 Community Facilities

juvenile services; and center for police neighborhood interaction. The station would be open 24 hours.

2.14.3.2 Size

Building: 20,000 square feet, preferably on one level.

Site Size: One acre, less if combined with other facilities.

2.14.3.3 Locational Criteria

- o Should be centrally located to serve existing and emerging population centers at Mission Bay and South Beach. A location on either Brannan Street or Townsend Street would be ideal.
- o Could be located adjacent to or planned jointly with new fire station facilities.
- o Must have several avenues of access and egress; three is preferred.
- o Preferably located on most stable land, so as to maximize earthquake safety and ability to respond in emergencies.
- o Line of site to Twin Peaks Tower to maximize microwave transmission.
- o Visible and accessible to the public. Not on a side street, or street with limited frontages.

2.14.4 Schools

The San Francisco Unified School District projects the need for a new Middle School in San Francisco by 1990. Population projections prepared by the School District suggest that the greatest demand for facilities by that year will be for grades 6, 7, and 8. Since 1980, the San Francisco school age population has been growing by 1.8 percent to 2 percent per year. Four sources of increased demand have been identified: (1) the San Francisco birthrate is up; (2) there is an influx of population

2.14 Community Facilities

from Southeast Asia living in the South of Market area; (3) Navy personnel stationed at Hunter's Point where at least one Battle Group will be stationed, increasing school enrollments by at least 600 children; and (4) additional demand for school facilities will be created by the project itself, depending upon project demographics.

2.14.4.1 Physical Components

The school site would include a gymnasium, cafeteria, school library, auditorium and approximately 32 classrooms. The school could be designed to be built in phases.

The school site could also accommodate a mass care facility, library, health care facility and/or child care facility on or near the site.

2.14.4.2 Size

The school would accommodate between 600 and 1,000 students, with a staff ratio of 1:20. The staff would therefore range between 30 and 50 people.

Building: The San Francisco Unified School District building guidelines allow for 110 to 117 square feet per middle school student. A 600 student school would require 70,000 square feet, while a 1000 student school would require 110,000 square feet.

Site size: Three to four acres, with a building occupying about one acre.

2.14.4.3 Location Requirements

- o Consider the soil conditions, geological requirements. Building on areas with liquefaction will result in greater costs and higher life safety risks.
- o Should be not more than one block from public transit.
- o Impacts from the freeway and major arterials should be minimized.

2.14 Community Facilities

-
- o Public health, park, library, senior and childcare facilities could be a part of the school site.
 - o Proximity to open space would offer opportunities for shared use of outdoor recreational areas.

2.14.5 Public Health

The Mission Bay project will result in increased demands on the facilities and services of the Department of Public Health.

As buildings are completed and occupied, there will be a need for health inspections of package good stores, restaurants and bars; increased population places demands on routine emergency services provided by the health department, such as paramedic/ambulance services. A major new residential and working population will result in an increase in the alcohol and substance abuse caseload of the Department of Public Health.

2.14.5.1 Physical Components

A multipurpose public health center could include the following services. Not all of these services must be on one site. Actual size is dependent upon site-specific needs.

- (1) Primary care, public health nurses, environmental health, health education, occupational health, toxics program, VD clinic, rodent control, emergency services, substance abuse, and mental health programs;
- (2) Forensic medical services, jail health services, and child abuse programs;
- (3) Board and care facilities to meet project needs as population grows older, plus current and projected proportion of citywide needs; and
- (4) Private primary care facilities.

2.14 Community Facilities

2.14.5.2 Size

- Multipurpose public health center: Assume a staff of 50.

Building: 20,000 square feet, two or three stories.

Site Size: 40,000 square feet. One acre.

2.14.5.3 Location Requirements

- o The multipurpose health center could be close to schools and daycare.
- o In the direction of major traffic flow from the development to the outside.
- o Public transit desirable.
- o Forensic medical services, jail health services and child abuse programs should be sited away from residential neighborhoods, possibly incorporated in police facilities.

2.14.6 Emergency Services

The Mission Bay site has been identified as an area in which seismic hazards such as liquefaction and associated lurching and lateral spreading may exist. The fill soils have been identified as having the highest potential for liquefaction.

Other potential hazards include rail traffic, car traffic corridors, possible toxic problems from future R&D, and dangers inherent in nearby port operations.

Because of the lay of the land, between freeway overpasses, and across bridges, in the case of a disaster such as a major earthquake, it is possible that Mission Bay will be cut off from health and mass care facilities in other parts of the City.

2.14.6.1 Physical Components

If appropriate, a mass care facility could be within Mission Bay. The mass care facility requires a kitchen, bathrooms,

2.14 Community Facilities

both large and small rooms, and open space. Traditionally, mass care facilities are located in schools. The Mission Bay project offers an opportunity to plan for mass care along with a new school site.

2.14.6.2 Size

Uses existing school facilities.

2.14.6.3 Location Requirements

- o High pedestrian traffic.
- o Near transportation.

2.14.7 Childcare

The increase in the number of households with both parents working, as well as the increase in the number of households headed by single women or men, has resulted in more demand for childcare facilities. Mission Bay should incorporate provisions for childcare, and recognize that these are often sponsored by non-profit organizations.

2.14.7.1 Physical Components

Classrooms, nursery, and outdoor play areas, fenced in from other activities.

2.14.7.2 Size

For office, for a maximum of 4.5 million square feet of new development, according to the formula both in the Downtown Plan and the citywide ordinance, 45,000 square feet of childcare facilities should be provided. Additional square feet could be required for R&D. In typical residential areas, there are about 30 children of nursery school age per 1,000 population. For a maximum of 8,500 to 10,000 dwelling units, childcare facilities would be needed for about 250 to 300 children. State standards require 35 and 75 square feet per child for interior and outdoor areas, respectively. Assuming 40 to 50 children per center, each would require 1,400 to

2.14 Community Facilities

1,750 square foot interior areas, with 3,000 to 3,750 square feet outdoor play areas. As some Mission Bay residents will work within Mission Bay, these totals overlap.

2.14.7.3 Location Requirements

- a Near an elementary school or community center.
- a Near a park.
- a Radius of area served about 1/2 mile.
- a Can be part of office or community buildings.
- a Not on a heavily-trafficked street.

2.14.8 Cultural Arts Facilities

While the Yerba Buena Project will incorporate spaces for performing arts, there is still an unmet need and opportunity for rehearsal space and other facilities for performing artists in the Mission Bay area. This is independent of facilities for community services and recreation.

2.14.8.1 Physical Components

Auditorium, stage and backstage including a minimum of two rehearsal rooms. Possibly a small art gallery.

2.14.8.2 Size

- a Buildings: 15,000 square feet.

2.14.8.3 Location Criteria

- a Near possible shared parking balancing daytime with evening use.
- a Near public transit.
- a Service access required for large sets.

2.14 Community Facilities

-
- o Visible and imageable node.
 - o Near nighttime amenities.

2.14.9 Churches

There has been a major growth of religious activity both in San Francisco and nationwide during the past decade. This phenomenon crosses economic as well as ethnic lines. In San Francisco, the school system receives many requests for the use of auditorium space for weekly religious observations. Child care centers and seniors centers can be located within churches. The Mission Bay planning process should consider appropriate locations for churches.

2.14.10 Libraries

With a large projected Mission Bay population, a branch public library should be considered.

2.14.10.1 Physical Components

A branch library would consist of an adult section, a childrens' section, and public meeting rooms. The meeting rooms can be used by any organization, contingent upon there not being a charge for attending the event. Arts programs can and do occur regularly at public libraries; the space can lend itself to the inclusion of a small gallery.

The need for a branch library is expected to emerge in approximately 10 years.

2.14.10.2 Size

Building: 7,500 to 10,000 square feet on one floor. Access to elderly and disabled must be ensured.

Site Size: 0.25 acres.

2.14 Community Facilities

2.14.10.3 Location Criteria

- o Commercial/retail center.
- o Good public transportation.
- o Not as an adjunct to a public park.

2.14.11 Multi-Purpose Community Center

A community center serving the residents of the Mission Bay neighborhood would incorporate a variety of activities.

The community center can be incorporated into a recreation and parks facility or with a variety of other community service facilities.

2.14.11.1 Physical Components

One main building serving the residential area. Room size should be flexible to accommodate both large and small gatherings. It could include the following features:

- (1) Meeting/class space for community gatherings.
- (2) A small theater offering space for non-professional productions. This could be coordinated with senior or childcare programs or facilities.
- (3) Gymnasium space for exercise and after-school programs.
- (4) After-school community programs.

2.14.11.2 Size

To be determined.

2.14.11.3 Location Requirements

- o Easily accessible to residential area.

2.14 Community Facilities

-
- o Near library and school facilities.
 - o Adjacent or incorporated into recreation and parks activities.
 - o Not on busy highway.
 - o Adjacent to open space.

2.14.12 Recreational Facility

A recreational facility would serve the residents of the Mission Bay neighborhood, complementing outdoor recreational facilities. The recreational facility could be included as part of a community center

2.14.12.1 Physical Components

One main building serving the area, including features such as a swimming pool, gymnasium for team activities, fitness center and dressing rooms.

2.14.12.2 Size

To be determined.

2.14.12.3 Location Requirements

Comparable to a Community Center

3.0 Land Use Program

This chapter discusses possible land use programs for Mission Bay. The land use programs list the mix of uses, such as housing and retail, office and open space, and the amounts of each use that could be within provided Mission Bay.

The analysis of the site has suggested broad program limitations. Anywhere between no acreage and up to 295 acres theoretically could be devoted to any land use. The feasibility and desirability of that full range for each use have been evaluated, to create target ranges for the land use program. The program, coupled with site and market conditions, policies and planning principles, and analysis of public needs and concerns, provides the basis for alternative land use plans. Following this chapter are illustrative land use plans that depict plan solutions accommodating alternative land use programs.



Four types of land use programs are presented within this chapter. These are balanced mixed use programs, a maximum housing program, a predominantly employment program, and a maritime container terminal program. Container terminal facilities can be combined with any of the first three. The ranges of uses set forth in the balanced mixed use program acknowledge the Mayor's letter of October 16, 1984 to Southern Pacific Land Company. The program within that letter represents a balance between residential and commercial uses to meet a broad range of City goals and to ensure that revenue from the project is available to help subsidize infrastructure, community services, open space and affordable housing requirements. That balance is explored within this chapter and in the land use plans of Section 4. The maximum housing program represents a concept advanced by some segments of the community for consideration. It takes housing as an absolute goal, and allocates housing to all portions of the site considered appropriate for housing use. Other land uses include commercial space, largely to provide buffering from traffic, and an open space system to serve the new community and augment the City system. The predominantly employment program has been advanced by Santa Fe Pacific for consideration. It takes commercial development and employment generation as a primary goal, although it includes housing as well. The fourth alternative,

the maritime container terminal program, is based up on the Port's 1981 master plan concept of a container terminal east of Third Street. The range of land uses has not yet been evaluated from the standpoint of economics. Such information is now being developed, and will be considered in formulating the Mission Bay Plan.

The basic planning principles used to establish the Mission Bay program are discussed in the analysis below. They are followed by a description of each of the program components. The proposed land use program alternatives are then presented.

3.1 Planning Context

3.1 Planning Context

There are 295 acres within the Mission Bay site. Approximately 50 percent of this industrially zoned and developed site is vacant or underutilized. This reflects changing economic conditions, especially the decline in industrial activity in San Francisco and in the rail activities that support it. Industries have been declining in San Francisco since World War II, which itself had reversed a similar decline. Declining industrial use within Mission Bay provides the City with a land resource. This resource can continue to provide employment opportunities as it has in the past. It can also begin to provide space to resolve other current and future needs associated with the City's growth.

First among these other needs is housing. Employment growth in San Francisco has outstripped housing growth for many years. Housing vacancy rates are low, and costs very high. While not all portions of the site are desirable for housing, the creation of a new, diverse residential community must be a high priority for San Francisco. Housing is discussed further in the next section of this chapter, Program Characteristics.



The City must continue to adapt to changing economic conditions and promote a diverse employment base. Mission Bay has been part of the City's employment sector in the past, and could continue to play that role in the future. The major city growth sector for the past two decades has been offices, primarily within the downtown. Recently, while corporate headquarters and primary office functions have remained downtown, back office or secondary office functions have begun to relocate to lower-rent suburban locations. This both disrupts the lives of San Franciscans who must then commute, and constrains the City economic base. Mission Bay provides an opportunity for the city to retain its share of this employment base. Another opportunity at Mission Bay is research and development, a form of light industrial activity expected to be the Bay Area's major growth sector through 2000 and a healthy economic sector thereafter. The City needs to explore provisions for new technology to expand and diversify its employment base. Both back office and research and development provide a range of employment opportunities,

3.1 Planning Context

including entry-level and lower-skilled jobs. Other commercial and light industrial activities may have a role as well. These are described further under Program Characteristics. The extent to which acreage should be set aside in Mission Bay for these uses is a major policy question to be resolved in future planning. Obviously, if more acres are devoted to these uses fewer acres can be devoted to housing.

Mission Bay is within the Central Waterfront area, and accommodation should be made for neighboring maritime uses. These uses warrant consideration in Port priority areas east of Third Street. Port and regional agency plans which reserve land for a container terminal east of Third Street are an alternative presented in this work, and are described further under Program Characteristics.

Within any community, there are associated needs for retail, services, cultural facilities and community facilities. These can help define its character as well as serve the population, and are included in all alternatives.



The open space opportunities of Mission Bay are unique, due to the presence of China Basin Channel and its sheltered tidal ecology, and the site's proximity to the Bay. Also, the need for open space in the eastern area of San Francisco is acute. Open space should both serve the new community and take full advantage for the City of the extensive site shoreline.

This provides a broad context for programming Mission Bay land uses; it reflects the competing needs of a variety of land uses on the site, as Mission Bay is developed over the next 20 or 30 years. Mission Bay should be planned to accomplish a transition from older land uses to uses meeting current and future needs.

Mission Bay should (a) provide opportunities for land uses contributing to citywide needs; (b) respond to existing physical conditions on and near the site; (c) create an entire new neighborhood and work place with associated amenities; and (d) generate sufficient revenue to support the infrastructure and other amenities necessary for the community as a whole. Each of these concepts is discussed further below:

3.1 Planning Context

- (a) The success of any major city depends in part on the diversity of the land uses and human activities that occur there. A healthy city includes housing, provides jobs, and offers amenities that enable citizens to conduct their lives and share social, cultural and recreational events. The development of a major new area the extent of Mission Bay can have the same range of activities, achieving a more urban than suburban quality. New housing is more desirable and successful when convenient shopping and personal services are planned nearby and when residents can easily get to their work places. New employment centers benefit from the same provisions. A community which includes daytime, evening and weekend activities provides support for a broad range of retail, service and cultural facilities. Such a community also calls for a variety of open space and recreational opportunities.



A mixed-use community would be able to meet the need for more housing to reduce pressures on the existing housing stock and accommodate more of those who wish to live within San Francisco. This includes new households formed by San Francisco residents, as well as people from other localities. Such a community can also help provide an economic base that reflects changing trends and is adaptive to growing economies when existing economies decline or find a competitive advantage elsewhere. The secondary office market and research and development activity are two areas which potentially can benefit San Francisco, as could other commercial uses within Mission Bay.

On the other hand, a predominantly residential community would go further in meeting the City's need for housing. More units would be created, and there would be less demand for housing with fewer acres devoted to job producing uses. A predominantly commercial development would emphasize meeting the City's employment goals. Additional secondary office space could further enhance the City's competitive position with suburban locations. The alternative accommodating a future container terminal would be

3.1 Planning Context



consistent with Port and regional plans for the area. It would preserve the option to some day construct a container terminal, augmenting the Port's cargo-handling capability.

- (b) The land use program must take into account the opportunities and constraints that the actual site and its surroundings present for development. Site conditions narrow the choices of appropriate uses, as some areas are better suited than others for specific land uses. Streets such as Townsend and King Street may carry substantial traffic, and are appropriate for office uses which can coexist with such activity and other commercial development to the north. Similarly, the area next to I-280 is more appropriate for research and development (R&D) uses than for housing or recreation/open space, because R&D can be designed to tolerate the I-280 noise levels and lack of visual amenities. Land along Third Street, especially at ground level, seems unsuitable for housing frontages because of the traffic and noise along this major street. Land along Mariposa Street with its I-280 ramps should also have some buffering for housing, due to the expected traffic level. Research and development uses south of Sixteenth Street would be compatible with neighboring uses. Land along the waterfront offers opportunities for maritime-related activities, recreational uses and public access, as well as providing an amenity for other uses such as housing. Land south of the Channel may be more appropriate for lower-rise housing, as taller buildings close to Potrero Hill could affect views.

For further analysis, please review the Land Use Opportunities Map (Figure 29) provided in the Background and Preliminary Findings Report for Mission Bay (November 8, 1985) which suggests where particular land uses are most appropriate. The map forms part of the basis for developing the Mission Bay land use program and illustrative plan alternatives in this report.

- (c) Ample acreage exists in Mission Bay to provide many new housing units in a configuration and at a scale that

3.1 Planning Context

exemplifies denser neighborhoods. This site can have a significant amount of low- to mid-rise housing with safe and adequate access and circulation, with major open space amenities and with neighborhood commercial facilities nearby. The new neighborhood can include housing blocks with a prevailing pattern of residential building scale and streets rather than a super-block development. Neighborhood shopping streets similar to Clement Street can be a focus for the neighborhood. Also, community facilities can be located conveniently for residents.

Similarly, work places developed in Mission Bay can be designed comprehensively rather than on a piecemeal or block-by-block basis. Open spaces for individual buildings can be designed and linked to others to serve a broader community according to large-scale planning and broader urban design criteria. Employment can support daytime amenities such as restaurants, shops and noontime recreation or open space areas. These retail uses and public spaces can be enjoyed during both the day and evening by employees and residents.

- (d) Commercial uses increase the possibility of generating revenues at Mission Bay to finance infrastructure costs and subsidize other uses. The site is so large in relationship to market demand that a variety of uses can be marketed and absorbed faster than any single land use, thus increasing the project's cash flow. Achieving the right balance between revenue-producing uses, revenue neutral (or break-even) uses, and uses that require subsidy such as open space, community services and affordable housing is critical to implementing a plan for Mission Bay.



3.2 Program Characteristics

3.2 Program Characteristics

To achieve the general criteria discussed above, a program for Mission Bay should include most if not all of the following land uses: housing, secondary office, research and development (R&D) or other light industrial use, neighborhood commercial, open space, community facilities, cultural facilities, a hotel, large-scale retail or wholesale/showroom space, and associated infrastructure. It should also acknowledge maritime activity.

Realistic amounts of each land use must be carefully combined to produce a buildable land use program. The appropriate amount of each land use is determined by its size requirements and relationships between that use and others (for example, residents and workers require retail and service uses).

Following is a discussion of the characteristics of each use and relationships between the various land uses that lead to the composition of a realistic land use program. This includes the constraints that limit the maximum and minimum acreage for each land use.

3.2.1 Housing



The greatest priority for land use at Mission Bay is housing. The City has low housing vacancy rates, and very high housing costs. Mission Bay is close to employment centers, thus minimizing the commute for its residents. Its climate is among the best in San Francisco, and the China Basin Channel and the Bay offer unique recreational opportunities.

Mission Bay Objectives and Policies (December 30, 1985) seek to "Increase substantially the City's supply of housing through development in Mission Bay." The desired housing program is further defined by Mission Bay policies calling for (a) a mix of housing sizes, tenure and types; (b) high housing densities; (c) housing affordable by a wide range of income groups; (d) housing for groups with special needs and/or lifestyles; (e) economic integration in housing; and (f) housing in residential neighborhoods of the character and quality of traditional San Francisco neighborhoods. When considered together, these qualifications for Mission Bay housing define

3.2 Program Characteristics

the amount of housing that can be provided on the site. The maximum housing program is constrained by the goal to not exceed eight stories for building heights, construction costs associated with increasing housing densities, and the desire to create a typical San Francisco residential neighborhood with open space to serve the population. It is further constrained by site conditions, such as the unstable soils which may increase housing construction costs, noise associated with freeways and major streets, and neighboring land uses.

All of these factors affect the recommended range of dwelling units and residential acreage for the Mission Bay program.

Decreases in the allotment of acreage for housing are constrained by the Citywide demand for housing of varying types, the need for affordable housing, and the desire for a typical San Francisco neighborhood and a housing emphasis in Mission Bay development. Citywide demand for housing is considerable, especially if more job opportunities are created in Mission Bay. The need for affordable housing also dictates that certain economies of scale (numbers of new units) are achieved to minimize construction and project management costs. When large numbers of housing units are built, fewer costs are passed on to renters and home buyers. The number and density of housing units also must be of sufficient scale on the Mission Bay site to create an urban neighborhood. Lower densities will produce a very anomalous suburban development, not in keeping with the urban form of the City, or City land values.

In the balanced mixed use alternative represented by the Mayor's letter, increases above approximately 110 acres (with 8,500 dwelling units on those acres) are constrained by the desire to diversify San Francisco's economy through development within Mission Bay, and the need to include commercial uses to produce revenue to help cover infrastructure and other public benefit costs of the development. These two premises will be tested in the predominantly housing alternative where the implications of about 10,000 dwelling units (125 acres) will be analyzed. Decreases below approximately 95 acres (about 7,200 dwelling units) are constrained for the reasons noted above. These will



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3.2 Program Characteristics

be tested in the employment alternative where the implications of fewer dwelling units will be analyzed.

The City's Office Affordable Housing Production Program (OAHPP) calls for housing to be constructed in conjunction with new office development (Ordinance No. 358-85, effective August 18, 1985). Housing units are required at a ratio of 38.6 units for each 100,000 net additional gross square feet of office space. Of those units, 62 percent must be affordable to low or moderate income households. The range of 7,200-8,500 units in the balanced mixed use program produces a surplus of housing above that required by OAHPP for the program's office development. A Mission Bay Policy (December 30, 1985) calls for integrating mixed-income units throughout the development. Future phases of the study will address this issue.

3.2.2 Secondary Office, Research and Development and Maritime Uses



A variety of employment opportunities can be created at Mission Bay. Such uses as secondary or back office, and research and development, offer an opportunity to diversify the City's economic base and employment opportunities, and retain existing jobs. These commercial uses can also provide revenue which can be used for infrastructure, open space, community services and affordable housing within Mission Bay. It is important, however, that secondary office and R&D space not be priced out of the market for such activities.

No other location in San Francisco is as logical for these functions, as Mission Bay is contiguous to the downtown area, little displacement is involved, excellent transit access can be developed, and vehicular and rail access is good. Maritime-related activity can be considered for areas of the site nearest existing Port uses. These would be supportive of the public investment in the Port and its related employment. Retail uses also should be created to support Mission Bay residents and workers, and can add to the employment opportunities.

All these types of employment provide jobs for a range of income levels and for a variety of skill levels. Although some

3.2 Program Characteristics

would be entry level jobs, most would require some education, skill and even experience or specialized training. Including these employment opportunities as part of the development would add to the vitality and activity within Mission Bay, and offer employment to its residents within easy walking distance of their homes.

Design, construction and use/occupancy will all provide opportunities for the employment of minorities and women and for participation by minority and women-owned businesses. Although not directly pertinent to a land-use study, these issues will be laid out more fully as project planning develops.

These uses and their suggested range for acreage if part of a balanced mixed-use program are described in the following sections. For the predominantly employment alternative, more acres are devoted to secondary office and research and development space than is described below. The constraints on increasing the acreage for such commercial use is further discussed in the preceding section.

3.2.2.1 Secondary Office

Secondary or back office can complement existing primary office uses by providing a San Francisco option for local businesses considering relocation of some or all of their functions to suburban office parks. It can retain jobs for existing residents who would otherwise follow their jobs out of town or have to find other jobs.

The range for acreage for office space in the mixed use program has been defined by the following factors: site suitability analysis, the desire to complement not compete with downtown office uses, general market conditions and land values, the citywide demand for a variety of job opportunities, the desire to ensure the viability of existing healthy economic activities, and the desire to ensure an implementable plan for Mission Bay. That proposed range is 16-25 acres or approximately 2.8-4.5 million square feet.

Height limitations on office construction, and the desire to complement, not compete with downtown primary office uses,

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3.2 Program Characteristics

limit the maximum acreage for office use in the mixed use alternative at 25 acres.

In the mixed-use alternative, the minimum of 16 acres of secondary office (3 million square feet) is premised on the use of office development as a transition from South of Market to Mission Bay, the City's desire to compete more effectively with other Bay Area cities for secondary office space users, and the need for a variety of revenue-producing uses to subsidize infrastructure and other development within Mission Bay. A predominantly housing alternative, in which about 10 acres would be available for secondary office use, will be analyzed to determine the implications of providing less acreage for secondary office use. Site circulation proposals for major traffic and transit thoroughfares north of the China Basin Channel suggest office could be a suitable use in that area of the site. The nearby South of Market area is predominantly light industrial and office uses, with a Townsend Street corridor designated for service secondary office (see South of Market Plan: A Proposal for Citizen Review, June 1985). The transition from this type of area into a new San Francisco neighborhood in Mission Bay can be made gradually through intervening land uses. Office use, which typically has fewer negative external impacts than industrial use and supports retail and open space amenities usable by Mission Bay residents, is an appropriate transition land use. Also, the major thoroughfare proposed in the King corridor both limits that area's suitability for housing, due to noise, air quality, and general impacts of high vehicular activity, and provides good access to and from workplaces located there.

The creation of office uses within the range suggested for the mixed use alternative would provide between 10,000 and 17,000 new or "retained in the city" secondary office jobs over the next 20 to 30 years. These would be about 25 percent executives and managers, 5 percent technical and supervisory, and 70 percent clerical and support, as presently envisioned.

3.2.2.2 Research and Development

Research and development (R&D) activity warrants exploration as a new sector for the City's economy. It is expected to be



3.2 Program Characteristics

the Bay Area's major growth industry through the year 2000 and a healthy economic sector thereafter. The City should, if possible, capture a share of that new technology-based employment, to diversify its economic base and work force. Declining economic sectors must be replaced to avoid job loss; Mission Bay, as a declining industrial area, should be renewed in a more competitive form.

Research and development can include not only pure research and project development space, but other light industrial uses such as light manufacturing, warehousing and distribution functions. It also includes "bio-tech." Research laboratories within Mission Bay could expand the research base of existing medical institutions. Such specialized research can lead to product development. Flexibility is important as the opportunities in R&D may change over time.

The range of acreage required for R&D in the balanced mixed use alternative has been delimited by the R&D site suitability analysis (see Background and Preliminary Findings Report), the desire to capture a share of Bay Area R&D growth, market conditions, the desire to further diversify the City's economic base within this historically commercial area, and the need for a variety of job opportunities. The proposed R&D program range is 26-38 acres (about 2-3 million square feet).

Increasing R&D acreage to more than a maximum of approximately 38 acres (or three million square feet) is constrained by uncertainty of the extent of market demand for such uses in San Francisco. Possible land use incompatibility with other proposed uses is also a constraint. Limited locations would be appropriate in Mission Bay because of proposed dense residential areas, since most R&D may use hazardous materials.

Decreasing the range to below 26 acres is constrained in the mixed use alternative by the desire to maintain a diverse economy, the need for sufficient space to attract R&D, the need for land uses on the site that can serve as buffers next to I-280 and the railroad tracks, and the need for a mix of revenue-producing uses. R&D is typically clustered within industrial parks, and sufficient acreage must be allocated if

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San Francisco is to be successful in attracting this activity and provide a concentration of R&D within San Francisco. The R&D use serves another function as well: it can be placed next to I-280 as a buffer between both the freeway and railroad tracks, and Mission Bay housing. The implications of decreasing this minimum acreage to approximately 4 acres will be analyzed in the maximum housing alternative.

The creation of research and development uses within the range suggested for the mixed use alternative would provide between 6,000 and 12,000 jobs over the next 20 to 30 years. These would be about 13 percent executives and managers, 10 percent engineers and technicians, 23 percent clerical and support, 40 percent production, and 14 percent other blue collar, as presently envisioned.

3.2.2.3 Maritime



The recommended range for maritime acreage is from zero (0) to fifty (50) acres, which include the container terminal alternative where the acreage is fixed at 50 acres. The minimum suggests that all land east of Third Street within the Mission Bay boundaries would be used for non-maritime development. The maximum suggests the opposite, that all this land would be required for maritime use. Container freight stations (CFS) within the site presently support maritime activity in providing truck docks, warehouse spaces, container storage areas, access by smaller trucks and refrigerated cargo access through rail and truck movements.

The maximum acreage is not essential to maintain existing maritime uses. It is assumed that existing bulk paper and coffee operations and ship repair at Piers 48 and 50 can be conducted on land presently used for those operations which is not in the Mission Bay site, thereby maintaining existing maritime. However, if future regional market trends call for maritime expansion with containerization next to the Mission Bay site, all of the acreage east of Third Street would be required as back-up land. This would require condemnation or other efforts to acquire privately-held portions of that land owned by Santa Fe Pacific Realty Corporation. Such a container terminal is called for in the Port's master plan, and

3.2 Program Characteristics

the San Francisco Bay Area Seaport Plan of the Metropolitan Transportation Commission (MTC) and the Bay Conservation and Development Commission (BCDC). Expanded container terminal operations would (a) maintain and enhance San Francisco's position in Pacific Rim trade, and its position as a headquarters city with respect to the financing, brokering, trade, customs and economic functions of international trade; and (b) provide jobs and secondary and tertiary economic benefits.

A decision as to whether that acreage will continue to be required for maritime use is not within the purview of this study. The program range maximum of 50 acres suggests that all of this land could be required for Port-related maritime use. The Port has suggested investigation of an alternative container terminal location, in the area between its present facilities at Pier 70 and Pier 80 (see Section 2.3). This would provide the opportunity for a consolidation of Port container operations within one contiguous area.

The potential incompatibility of major port container terminal activities near a new neighborhood in Mission Bay should be recognized. Port container terminal activities in this location would (a) minimize residents' access to the Bay; (b) add truck traffic on Third; (c) pose visual obstacles (cranes); and (d) require site illumination during nighttime hours if double shifts are required. Providing no maritime acreage within the planning area limits adjacent support land for existing maritime activities and precludes a container terminal. At a minimum, the Port expects to maintain existing pier maritime use.

3.2.2.4 Relationships to Housing Demand

The ranges of office, research and development, and maritime uses within Mission Bay are expected to result in a housing demand within San Francisco accommodated by the range of housing proposed under both the maximum housing and the balanced mixed use program alternatives. The predominantly employment alternative is not expected to provide sufficient housing to meet its housing demand. This will receive further analysis as the planning process continues.



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3.2.3 Retail



Retail uses should be provided to support residents and working persons in Mission Bay, add vitality within the area and provide employment. The programmed local-serving retail acreage range, from 7-15 acres, was identified based on the demand generated by residents and employees on the Mission Bay site and the opportunity for larger volume stores on site. Minimum neighborhood-serving and work place-serving retail demand may reach 300,000 square feet, some of which may be free-standing. The rest would be at the ground floor of other uses. This minimum is based on expected annual retail expenditures per household (assuming a maximum of 8,500 households) and annual expenditures per capita for workers in Mission Bay (assuming a high of about 29,000 new workers in all sectors). This retail use provides employment opportunities for approximately 1,000 retail workers and further diversifies the employment base offered in Mission Bay. It also provides small business opportunities.

The opportunity to provide acreage for large-scale or discount retail on the site could produce the maximum retail acreage of 15 acres. Demand for large-scale retail extends beyond the Mission Bay community, and is based on prevailing general market conditions which suggest a demand for additional acreage for such a use. A possible doubling of the area currently used by such uses nearby would result in the need for an additional five (5) acres for 200,000 to 400,000 square feet (including on-site parking), of multi-story retail or about 700 to 1,700 jobs. Total retail square footage then would be 500,000 to 800,000 square feet and total retail job opportunities would be about 1,700 to 2,700. This use has the advantage of not generating peak hour commutes, and potential sharing of parking with office and R&D uses.

Wholesale/showroom space, perhaps associated with retail functions, could be a viable use of land adjacent to the Showplace Square area. About 10 to 12 acres, about 1 to 1½ million square feet of space, could be provided to supplement that nearby activity.

3.2 Program Characteristics

3.2.4 Open Space

Open space to meet the needs of Mission Bay residents and workers and for the general public should be provided in Mission Bay. Such open space must be subsidized either by the developer or provided by the City.

Department guidelines indicate that 4 to 5 acres of local and citywide open space should be provided for every 1,000 persons. About half (2.5 acres) should be provided within new developments to serve local residents. Active recreation facilities, such as play fields, should be included. If from 7,200 to 8,500 dwelling units (assuming 2.1 persons per dwelling unit) as per the balanced mixed use program were built on this site, the guidelines would recommend provision of approximately 38 to 45 acres of open space. More open space would be required for the maximum housing program, less for the predominantly employment program.



Open space planned for office and R&D areas, 25 percent and 13 percent of such sites respectively, would require approximately 9 to 13 acres. Thus, local-serving residential, office and R&D open space ranges from 47 to 58 acres. The existing Channel area of 12 acres adds to this range, reaching 59 to 70 acres for the mixed use alternative. The desire to create a typical San Francisco neighborhood and a marketable project suggests additional open space to provide character and identity. This amount of open space, as well as any contribution of the development to open space needs elsewhere, cannot be quantified in the same fashion as the foregoing range.

There is also a desire to provide some unique open space amenity here for citywide residents and employed persons. The Recreation and Open Space Element of the Master Plan (1973) calls for nine (9) acres of new public recreation areas along the Channel shoreline. Provision of a wetland habitat for the preservation and enhancement of tidal open space to support indigenous wildlife is under consideration. This would reflect the historical status of the Mission Bay site as a bay, bordered by marshes and the Mission Creek estuarine system. It would also ensure that Mission Bay, following its

3.2 Program Characteristics



development, would continue to provide a refuge for birds and other wildlife, and provide an observable tidal ecology as a balance to intense urban activity. Fifteen to eighteen (15-18) acres is regarded as a minimum number of acres required to provide open space acreage, wildlife refuge areas and landscaping to foster wildlife use and some tidal open space for public education. While such passive open space would serve the Mission Bay community, because of its regional resource value this acreage should be considered in addition to the basic Mission Bay-serving open space.

In order to provide substantial open space for Mission Bay, to benefit on-site residents and employed persons and all San Francisco citizens, including those in areas like nearby South of Market, 68 to 95 acres are recommended for local and region-serving open space. This range includes the Channel waters, as they will augment adjacent open space quality.

Increasing the acreage above a maximum of approximately 95 acres is constrained by market conditions; the desire for an urban not suburban neighborhood; the desire to focus visitors seeking open space on certain public areas rather than draw them into the Mission Bay neighborhood; the desire to include substantial numbers of housing units and diversify the City's economic base; the need for revenue-producing uses to subsidize open space, infrastructure and other public benefits; and possible conflicts with other proposed land uses, notably maritime activities. Open space should complement not dominate other Mission Bay land uses. The shoreline and other perimeter public open space areas can draw people from throughout the City without impacting the Mission Bay neighborhood. Other open space within residential areas should be primarily for those residents, in an amount and distribution that does not draw large volumes of visitors, so that neighborhood quality can be preserved.

Reducing open space acreage below the minimum proposed 68 acres is constrained by the need to meet city open space standards as discussed above, the desire to create a marketable neighborhood and workplace and the desire to provide exemplary open space opportunities of benefit to the City as a whole. Significant open space will contribute directly to the

3.2 Program Characteristics

marketability and desirability of Mission Bay residences and workplaces and indirectly to the quality of life citywide.

3.2.5 Community Facilities

Certain community facilities and services should be provided for residents and workers in Mission Bay to ensure life safety and the general welfare and create opportunities for social and cultural events. Such facilities must be either subsidized by the developer or provided by the City. In many instances these facilities, while desirable for future residents and employees of Mission Bay, do not add to the marketability of the development and its ultimate feasibility.

Basic services, including fire and police, may require one acre at some location in the Mission Bay site. This acreage is derived from Fire and Police Department plans and operational standards and concerns that Mission Bay could become isolated in a major earthquake and therefore needs to be self-sufficient. Allocation of specific acreage for fire and police stations will be made at a later date.

A middle school (grades 6, 7 and 8) site of approximately three to four acres may be required in San Francisco. This need is derived from estimated Citywide educational needs, based on population increases. The population increase anticipated at Mission Bay suggests that the site or its vicinity is an appropriate location. Acreage less than 3 acres is insufficient for a school site.

Public health, childcare, cultural facilities, and a branch library are also considered as possible elements of the land use program for Mission Bay. These services and facilities can be combined in mixed-use buildings, in probably more than one location. These can be interspersed with commercial uses along neighborhood commercial streets and other streets where housing is not desirable at the ground level. Thus, the possible 300,000 square feet for such uses can be considered as part of other land use allocations. If however such facilities were located in one four-story building, two acres would be required. Recycling facilities can be provided in scattered parking stall-sized spaces within the site. The actual desired

3.2 Program Characteristics

location of all these various uses within the project site will dictate more precise acreage requirements and arrangements.

The resulting total acreage for free-standing community facilities including a school would be 6 acres. Increasing the maximum acreage above 6 acres is constrained primarily by competing demand for land. Decreasing the acreage to below about 2 acres is constrained by community need for basic facilities.

3.2.6 Hotel

A hotel should be considered as a possible component of the Mission Bay program. It complements both office and residential uses by providing necessary and convenient lodging as well as gathering places for businesses and for residents. It supports retail and services. The range of acreage for a hotel, 0-4 acres, is defined by competing demands for land and typical sizes of hotels in comparable settings. An increase in hotel acreage beyond 4 acres does not appear necessary in this area. If a hotel is included, at least two acres are required. A hotel would provide revenue to support other aspects of the project, without the disadvantage of requiring peak hour commuting of employees.

3.2.7 Infrastructure and Unusable Land

Infrastructure includes all circulation and utility rights-of-way or sites required for a functioning Mission Bay development. (Acreage for open space, sometimes grouped with infrastructure, has been considered independently in this program.) Acreage and funds are required for the following uses, often to be provided in joint rights-of-way, trenches or corridors: transit, vehicular, bicycle and pedestrian routes; gas, electrical, water, sewer, storm drainage, telephone and cable services; and any necessary utility or roadway work places. Unusable areas include areas under or next to freeways or freeway ramps and railroad tracks. Infrastructure costs of developing Mission Bay also include removing the I-280 Freeway ramps and structure between 3rd and 6th Streets, replacing the ramps, and any alterations to the Caltrain.



3.2 Program Characteristics

Acreage for these uses has been estimated based on assumptions about the standard width of various roadways, standard criteria for utility easements and an evaluation of the suitability of land for development in Mission Bay. Certain areas appear to be unusable although most of the site is developable. Infrastructure should be provided for that buildable area.

Both increases and decreases in the estimated acreage for infrastructure and unusable land will probably occur at a later date and will be based on a more specific land use plan. At present, the estimated acreage of 55 to 65 acres conforms to industry standards for such uses.

3.2.8 Summary: Land Use Program Alternatives

Overall, the Department seeks to provide a healthy San Francisco living and working environment in Mission Bay. To do so requires a balance of various land uses which are compatible with each other on the 295-acre Mission Bay site. The programs outlined in the following table represent a range of alternative land uses which will receive further consideration in the planning process for Mission Bay.

The following land use programs list land uses for Mission Bay with associated ranges of acreage for each.



3-22 LAND USE PROGRAM

3.2 Program Characteristics

Mission Bay Land Use Program Range

<u>Use</u>	<u>Acres</u>
Housing	88 - 126 acres (6,350 - 10,240 dwelling units)
Public Open Space*	72 - 99 acres
Office	10 - 45 acres (1.7 - 5.7 million square feet)
R&D	12.8 - 38 acres 975,700 - 2.8 million square feet)
Retail	7.2 - 16 acres (157,000 - 336,000 square feet)
Maritime	0 - 45 acres
Hotel	3.5 - 4 acres
Community Facilities	1.2 - 3 acres
Infrastructure and Unusable Land	62 - 69 acres
TOTALS	176 - 372 acres

* Includes public open space within housing, office and R&D acreage.

3.2 Program Characteristics

This land use program provides realistic ranges for each land use that may be appropriate for Mission Bay. Notice that planning for the minimum of each range in the mixed use alternative would require a 176-acre site and planning for the maximum would require a 372-acre site. Incorporation of maximums from the other alternatives would broaden this range even more. Maximum acreage for all uses cannot be achieved on this 295 acre site and some compromises or tradeoffs must be made. In the following chapter, six illustrative plans show how the programmed uses can be arrayed on the land. A land account for each plan indicates how much acreage of each use could be achieved.

4.0 Design Concepts and Illustrative Plans

This chapter presents three design concepts for Mission Bay, with three different street grids and open space systems. These design concepts are the basis for six illustrative land use plans that incorporate the land use program alternatives of Chapter 3. Each design concept accommodates the balanced mixed use program previously discussed. Each can also accommodate the increased housing, increased employment or container terminal alternatives, although some combinations of design concept and program would be more successful than others.

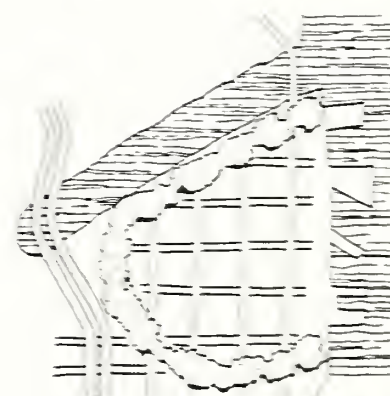
Each of the three design concepts illustrates a dominant open space pattern and street grid that would significantly influence the character of Mission Bay. A descriptive statement on the advantages and disadvantages of each design concept is provided. This is followed by illustrative land use adaptations of that concept. Also included are generic sections through various open space elements (for illustrative purposes only, specifics are not yet designed) and discussion of possible open space alternatives. These concepts show only major open spaces. Smaller open spaces would be planned and developed as part of more detailed pre-construction phases. To facilitate comparisons with other San Francisco open spaces, Appendix B includes several City parks drawn at the same scale as the illustrative plans, and provides the park acreages.

The purpose of this chapter is to generate discussion about the trade-offs between the general design configurations (shown at the right) and between uses. Decisions about the many trade-offs will lead to development of a Mission Bay Plan in which all aspects of the plans are greatly refined. It is possible to create a buildable and desirable Mission Bay community, the question is how best to do so.

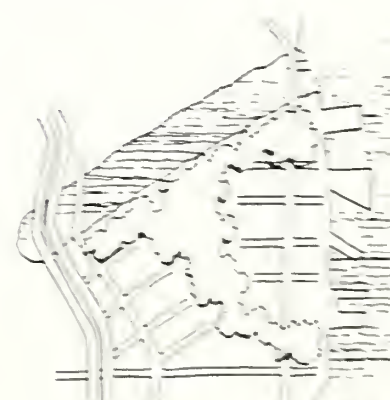
As the discussions of Plan Determinants (2.0) and Land Use Program (3.0) show, there are many variables to be considered in the formulation of any plan for the Mission Bay site. No particular plan can totally optimize every determinant and every land use element. The finite land area and physical constraints will not permit a perfect plan that would meet all the goals of every interested group, all the Mission Bay objectives and policies or all the program elements. Each



Concept A



Concept B



Concept C

illustrative plan represents trade-offs between competing uses and design concepts. For example, a plan that would maximize housing cannot provide maximums of other uses too. The six illustrative plans present the choices that exist for Mission Bay and show the effect of various trade-offs and configurations. Each also meets as many Mission Bay objectives and policies as possible.

There are areas of commonality among the six illustrative plans. All plans show that the China Basin Channel is expanded, but avoid the significant cost of relocating major box culverts under Berry and Channel Streets. The Third and Fourth Street Bridges are consistently retained. All plans assume that the existing I-280 Fourth Street ramp will be removed, at least back to Sixth Street. North of the Channel, a major transit corridor is planned in each concept, linking Caltrain and Muni Metro and providing key transit stops. For all plans, extensions of transit lines off this corridor will serve the area of the site south of the Channel. It is assumed Muni trolley or bus service will be provided on major arterials throughout the site. For each plan a new bridge to serve the western portion of the site is extended over the Channel between Owens Street and Sixth Street, and a major street follows an Owens Street alignment south of the Channel. All concepts assume building heights will not exceed eight stories to minimize view blockage from Potrero Hill. The existing houseboat community is retained in each concept. All concepts assume some buffering for any housing uses along Townsend, King, Third, Fourth and Mariposa Streets. Certain elements of the plans such as the I-280 ramp solutions may be interchangeable.

Three different wildlife areas are described in the text. All are on the Channel. One is east of Third Street, one extends from east of Third to Fourth Street and the third is located between Fourth and Sixth Streets in the Channel. The first two would allow the establishment of a significant wetland habitat, the third would provide an improved but limited wildlife environment only. Except for these elements, the concepts are distinct alternatives that should be evaluated individually.

Following are three report sections focussing on imposing land uses on the three design concepts. Section 4.1 describes Design Concept A and appropriate land use plans based on that concept. Section 4.2 describes Design Concept B and land usage most suitable for that concept. Section 4.3 describes Design Concept C and land usage compatible with it. The balanced mixed use program is accommodated within each Design Concept, in Illustrative Plans 2, 4 and 6.

The maximum housing alternative program, Illustrative Plan 1, is accommodated within Design Concept A. Concept A was used due to the greater housing efficiencies it achieves through maintaining the South of Market grid through the site to Sixteenth Street, while relocating a portion of Third Street. In Section 4.1, a variant of this Plan 1 is also presented, which leaves Third Street as it is. The predominantly employment alternative, Illustrative Plan 3, is accommodated within Design Concept B. Concept B can be easily adapted to accommodate additional office uses east of Third Street and south of the Channel by the Caltrain Station. The container terminal alternative is accommodated in Design Concept C, as Illustrative Plan 5. As shown in Section 4.3 Concept C with its large central open space is more inwardly focussed and less oriented towards the Bay, and thus is more easily buffered from a container terminal across Third Street.

For each design concept, additional housing can be situated north of the Channel between Fourth and Sixth Street, south of the Channel between Third and Fourth Streets, and south of Sixteenth Street. Each design concept can accommodate additional employment-generating uses south of the Channel and east of Third Street. For each concept, if the proposed Port container terminal is developed alongside this site, all of the land east of Third Street would be required for Port operations. In addition, the area immediately west of Third Street should have office, R&D and/or retail uses there rather than housing if Port plans are implemented, and open space would not connect south through the site to the Bay. The open space system in each concept could contain water elements such as a canal or fountains although quality public open space can be provided without water elements.

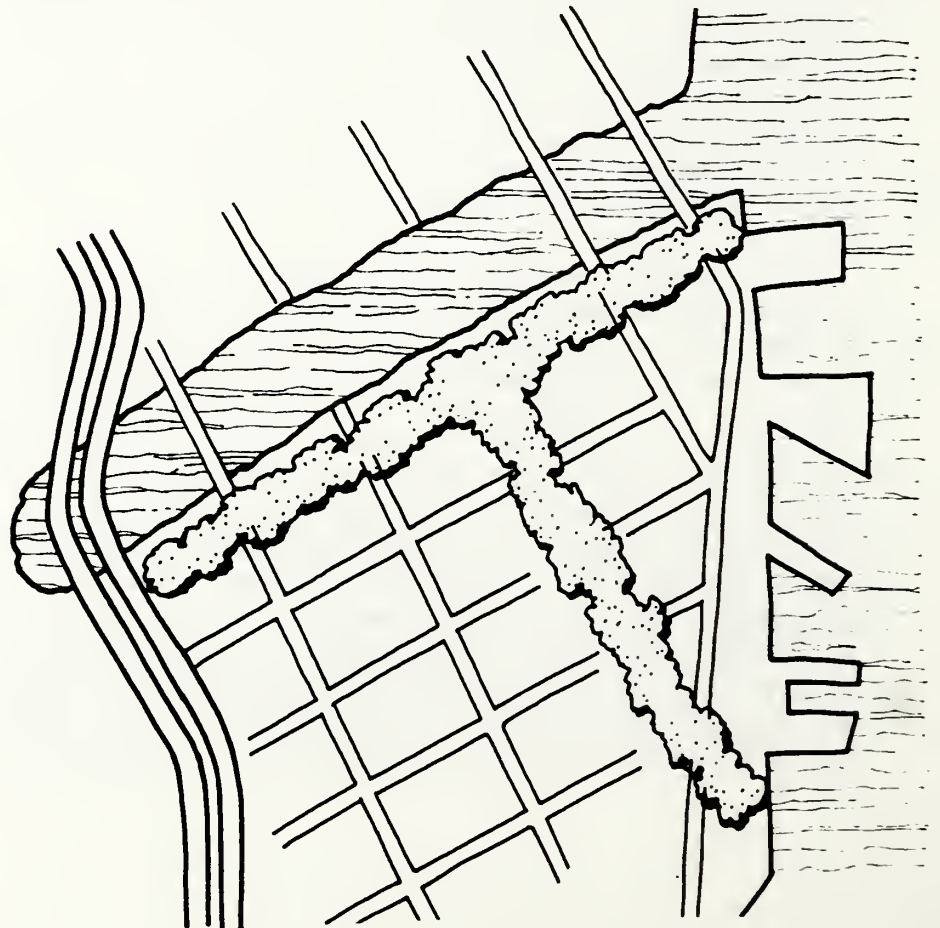
4-4 DESIGN CONCEPTS

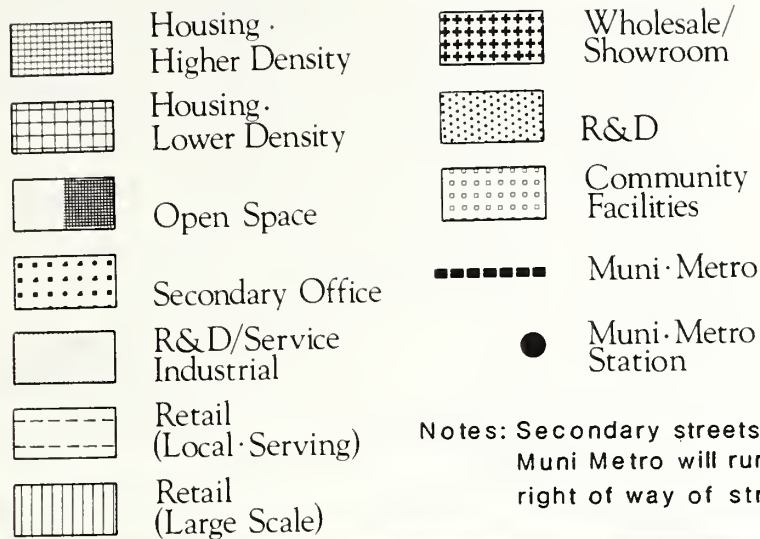
4.1 Design Concept A

4.1 Design Concept A

4.1.1 General Characteristics

This illustrative plan takes its general pattern from the extension of the South of Market street grid. The result is a continuous block pattern from Market Street to Sixteenth Street, with the China Basin Channel conforming to the street orientation. Along with open space improvements on both sides of the Channel, a central spine for open space is extended into the heart of the site perpendicular to the Channel. The land uses shape and define this open space. This spine would provide a central public amenity for residences on both sides of it. Another dominant feature is the relocation of Third Street to China Basin Street, essentially relocating Third Street traffic to the Bay shoreline, thereby directing major traffic volumes to the perimeter of a predominantly residential neighborhood.





Notes: Secondary streets are not shown.
Muni Metro will run within the right of way of streets.

Illustrative Plan 1

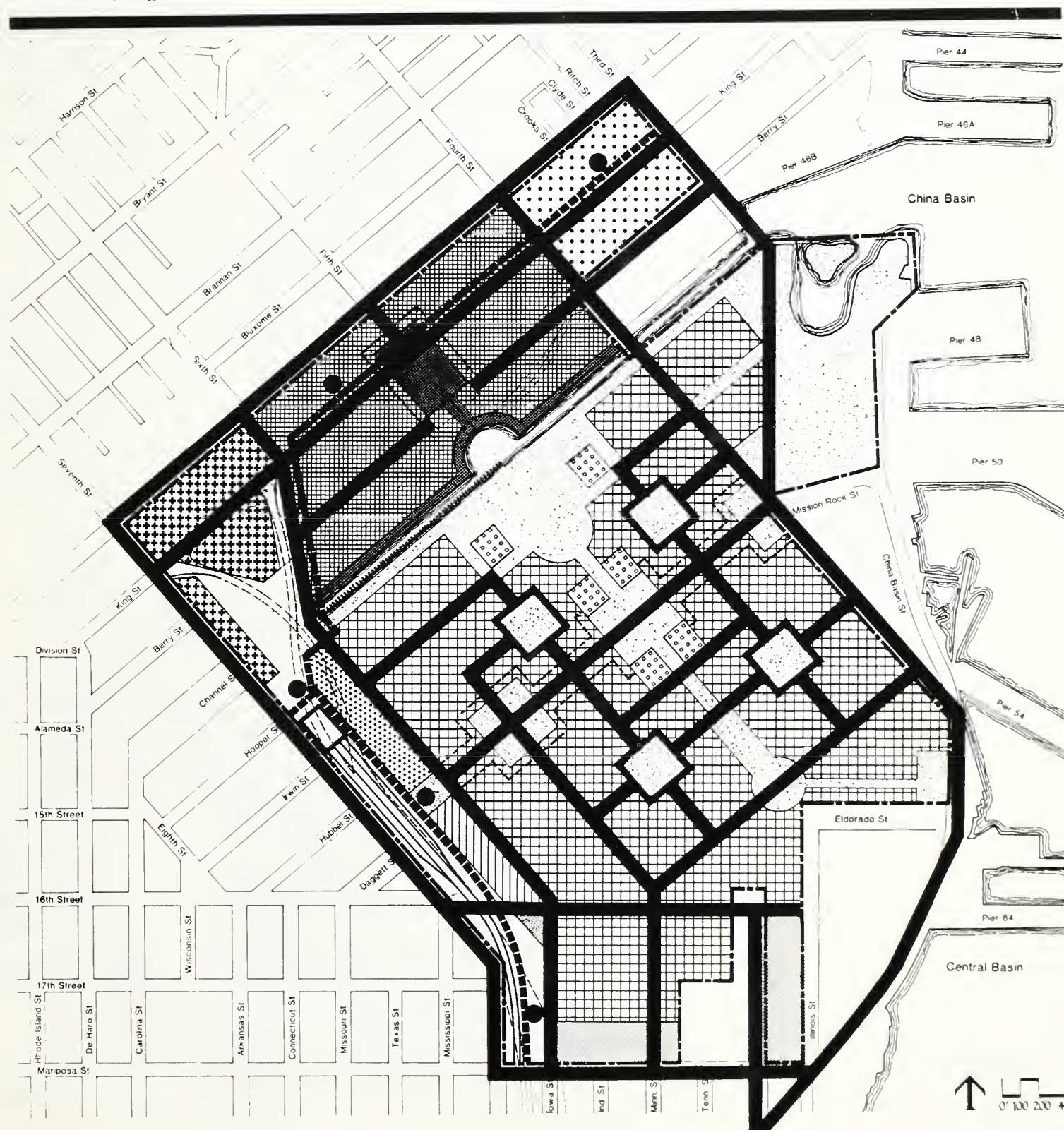
Mission Bay San Francisco

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Illustrative Plan 2

**Mission Bay
San Francisco**

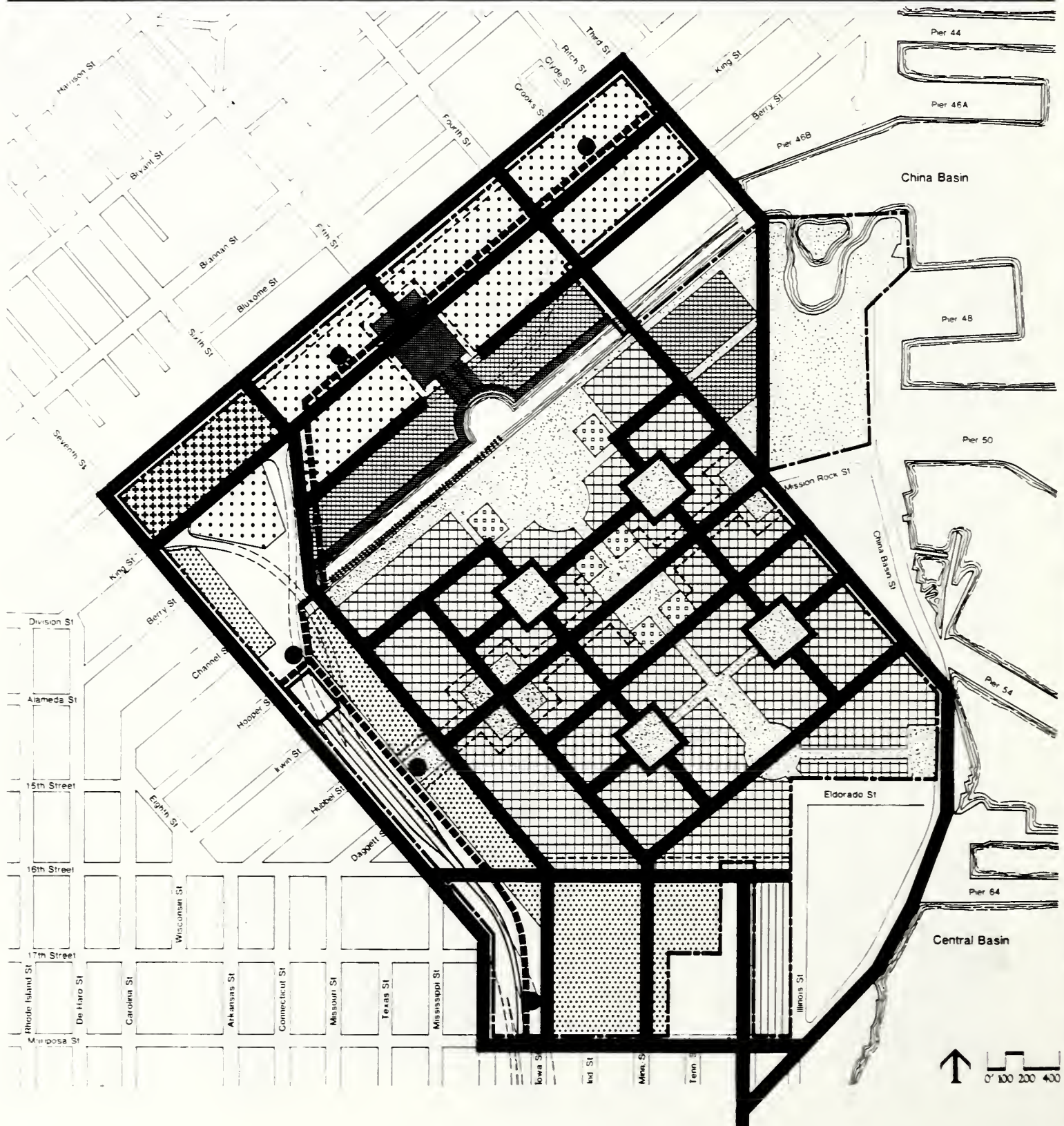
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- | | | | |
|--|--------------------------|--|----------------------|
| | Housing - Higher Density | | Wholesale/Showroom |
| | Housing - Lower Density | | Community Facilities |
| | Open Space | | Muni-Metro |
| | Secondary Office | | Muni-Metro Station |
| | R&D | | |
| | Retail (Local-Serving) | | |
| | Retail (Large Scale) | | |

Notes: Secondary streets are not shown. Muni Metro will run within the right of way of streets.



4.1 Design Concept A

4.1.2 Land Use

High density uses are north of the Channel, as a transition from nearby South of Market office and light industrial uses. The major open space amenities offered by the Channel would be for the largest aggregations of Mission Bay daytime and residential populations expected there. The blocks between Fourth and Sixth Streets could be either housing or offices, depending upon the land use program to be accommodated. South of the Channel would be primarily lower-density residential, creating a fairly typical San Francisco neighborhood, with orientation of residences to the streets and open space, a central neighborhood commercial street and intermittent small parks. The recognizable character of the Mission Bay neighborhood could be readily established with first phase housing along the Channel. Higher density housing could be within the "Banana Triangle" block between Third and Fourth Streets opposite the China Basin Building. An open space waterway could be provided through the center of this neighborhood that could flow between the Bay and Channel. Alternately, strong architectural design along this open space spine could substitute for a canal in establishing the quality of this open space corridor. The corridor would offer a central recreation/enjoyment area for the community. No other San Francisco neighborhood has yet taken such advantage of its proximity to the Bay.

Along the street corridors, views of the Bay, Nob Hill and the shipyards are provided. The axial street for neighborhood retail and services would offer many of the same social and cultural opportunities that other San Francisco neighborhood streets, such as Chestnut Street or 24th Street, provide. These pedestrian-oriented open spaces and retail streets could regulate the pace of neighborhood life at pedestrian speeds and allow linear connecting routes between homes, the Bay, the Channel and work places.

On the western edge of the site, R&D could be alongside the I-280 structures, as a buffer for central Mission Bay development. R&D can tolerate the freeway noise and lack of aesthetic values in this area better than any other land use proposed for Mission Bay. The R&D would be oriented toward

4.1 Design Concept A

the center of the site. Alternatively, large-scale retail uses such as a supermarket could provide a similar function, while serving adjacent neighborhoods as well as Mission Bay. Sixteenth Street would contain other retail uses, both to serve the area and provide buffering from Sixteenth Street traffic.

At the southern edge of the site, R&D would front on Mariposa Street across from existing industrial activities. Housing could be developed just north of this R&D, focused inward toward the center of the site and extending to 16th Street. Alternatively, campus-like or traditional industrial-block R&D sites could be planned here, providing street-level open space amenity.

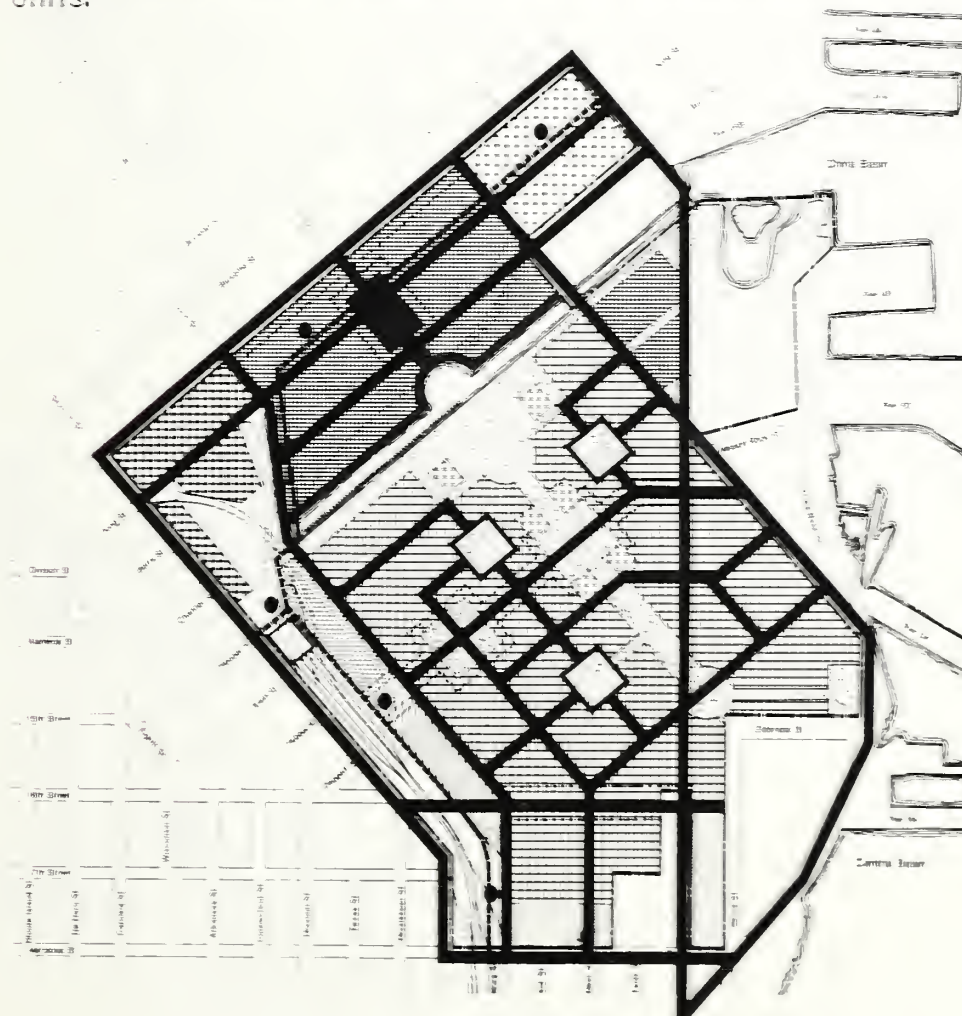
East of Third Street, on a 20-acre site with Bay frontage, a viable wetland habitat could be provided. It is appropriately isolated from nearby human activities yet could be visited and seen each time one traveled on Third Street. Recreational playing fields could use about one-quarter of this site, with some landscaped buffering between this active recreational use and the wetlands.

To the south where Fourth Street merges with the existing China Basin Street and the open space system connects with the Bay, another unique parcel is created. It would probably be site planned more like a planned unit development, suggesting economies of scale for development and requirements for development and maintenance of high quality landscape design to ensure that this connection to the Bay benefits all of Mission Bay. Southeast of the circular open space/waterway node is another site, suitable for housing or, perhaps, a school.

The South of Market grid can create a large Mission Bay neighborhood with high land use efficiency for maximum housing. It would be necessary, however, to relocate four (4) blocks of existing Third Street. There are costs associated with this solution: (1) the existing Third Street right-of-way must be abandoned; (2) utilities (several) under these four blocks must be relocated or a right-of-way for their trenches must be maintained; and (3) improvements to connect Fourth Street with China Basin Street and improvements to China Basin Street must be made. Vehicular traffic using Third

4.1 Design Concept A

Street, a major north-south corridor, would be re-routed east, nearer the shoreline. Impacts on access to existing maritime operations at Piers 48 and 50 must be evaluated, in coordination with the Port. Also, the impact of placing another major roadway at the water's edge in San Francisco must be considered. Pedestrian access to the water's edge would be diminished if the new route is located in the present China Basin Street right-of-way, although special attention to this issue in its design could ameliorate the problem. If Third Street is retained with this Design Concept A, the land use efficiency drops and the broad protected neighborhood is significantly reduced. The following variant is presented which retains Third Street. It represents a loss of about 400 dwelling units.

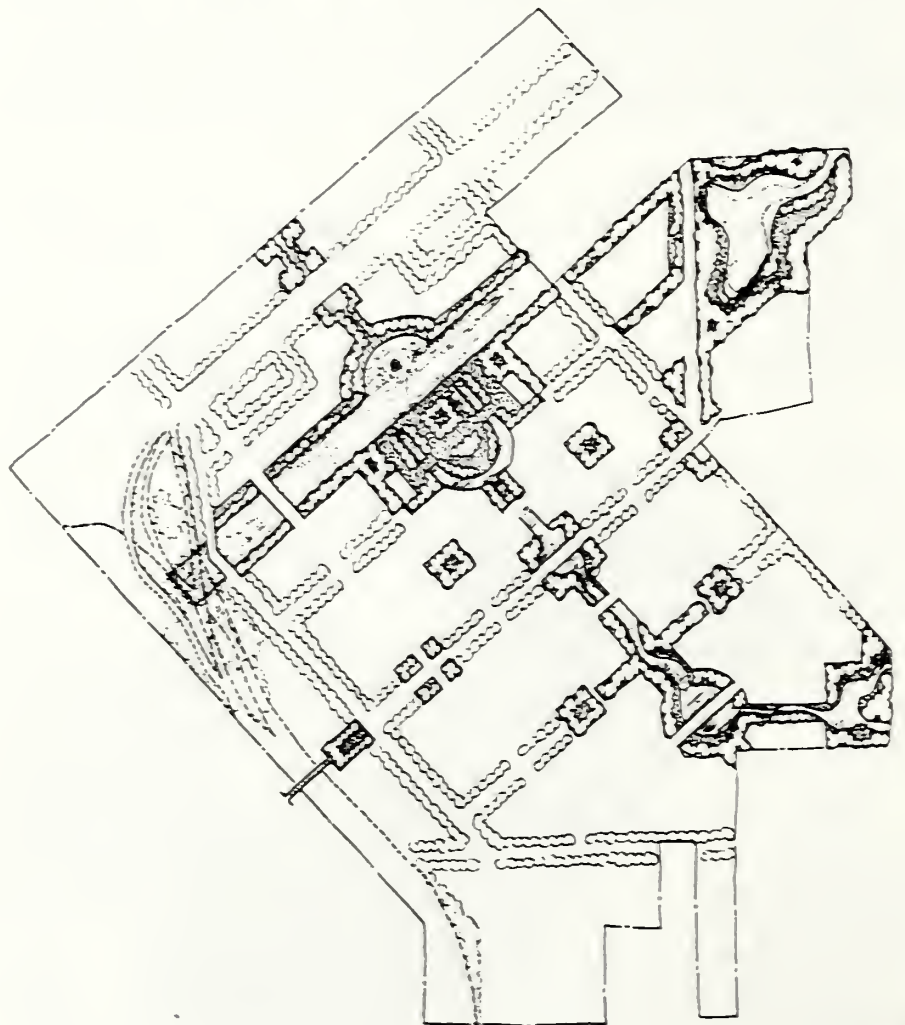


4-10 DESIGN CONCEPTS

4.1 Design Concept A

4.1.3 Open Space

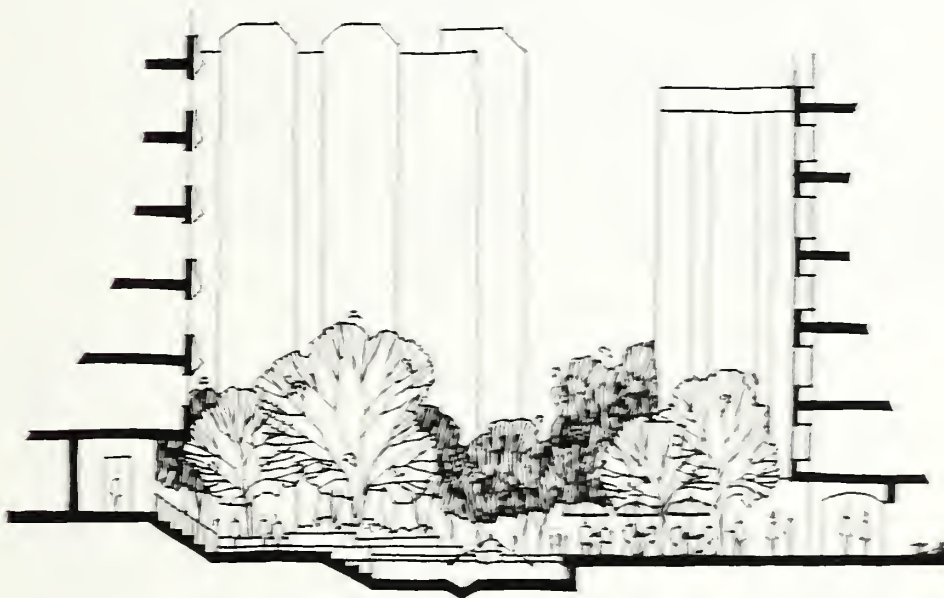
The formal central spine using an extended Fifth Street axis would be the primary internal orienting element of this open space system. A non-tidal canal feature could meander through the spine, in a formal or informal pattern, with community facilities, neighborhood retail and residential uses, plazas and plantings supporting its path edges.



Concept A

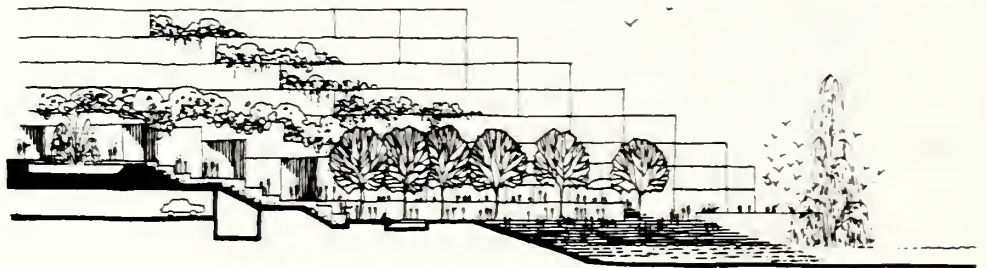
4.1 Design Concept A

Midway along its length, the pedestrian spine could be crossed by a tree-lined shopping street extending from public open space squares at Owens Street and Third Street. The four main residential quadrants resulting from the grid pattern, the central spine and shopping street would each contain a major park block to create an association of the residential units with open space amenities. Pedestrian circulation throughout the project would largely utilize the central spine and sidewalks to interconnect all the parts of the development, including access to Potrero Hill, and any future waterfront development, with occasional greenways projecting off the central spine.

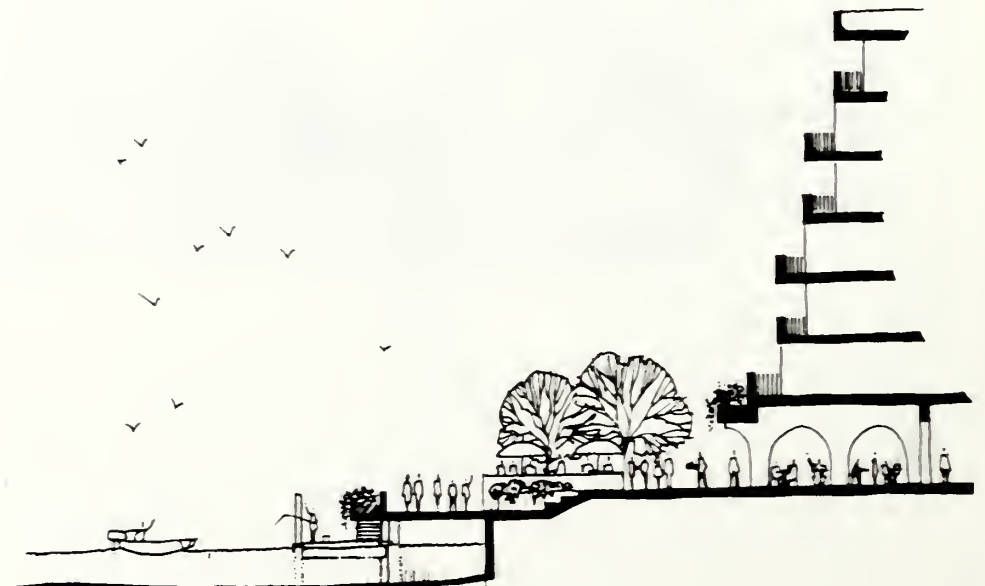


4-12 DESIGN CONCEPTS

4.1 Design Concept A

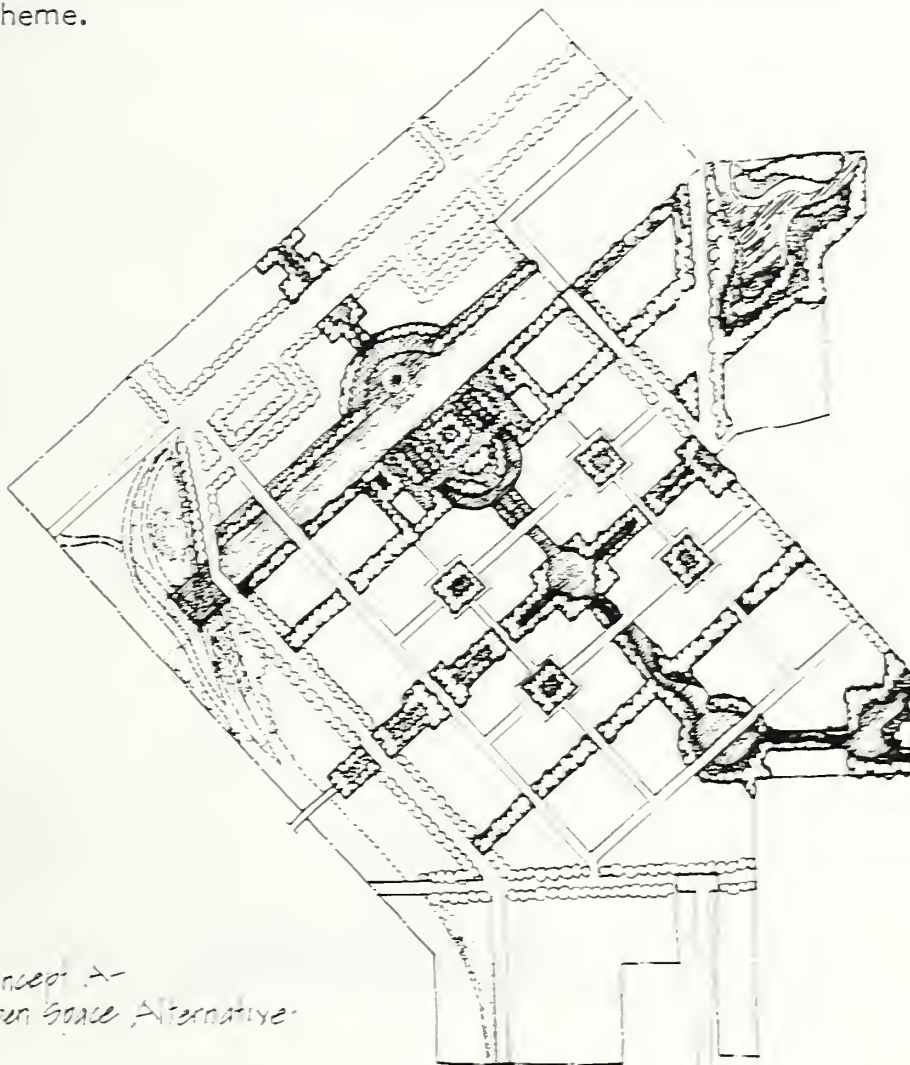


The junction of the central spine with the China Basin Channel is a major focal point of the open space system for areas both north and south of the Channel. A formal arrangement of significant buildings and open space features on the southern bank, including possible waterfalls which drop from the central canal into the Channel, would reflect the impressive high-density residential and grade-level retail complex on the northern bank. A possible water spire near the north side of the Channel could serve as a centerpiece to the Mission Creek open space and a destination point for travelers or viewers in South of Market. The formality of this concept suggests the need for strong architecture along the central spine and the channel.



4.1 Design Concept A

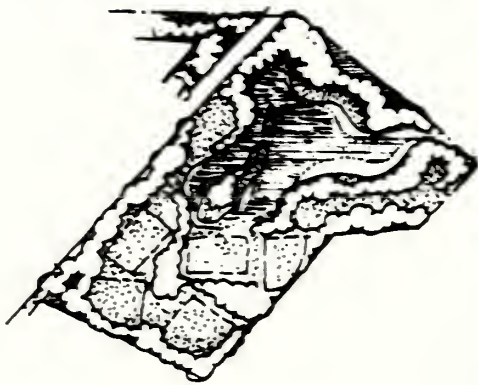
The open space could become a more interconnected system if the base scheme were modified as shown in the alternate scheme.



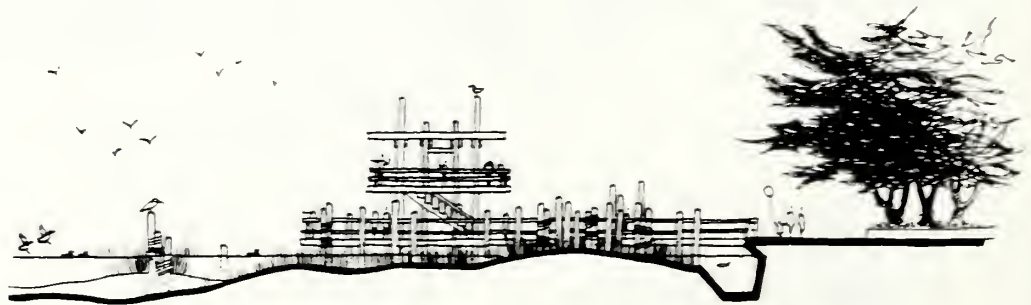
By adding three main pedestrian corridors perpendicular to the central spine and adjusting the location of the four park blocks, the scheme can enable all the housing blocks to front onto open space amenities while creating major pedestrian linkages throughout. A larger network would therefore be accomplished with the elimination of some streets and minimal reduction in land use efficiency.

4-14 DESIGN CONCEPTS

4.1 Design Concept A



A wetlands habitat and play fields would be located on the parcel northeast of Third Street. Studies to date show this to be the most favorable location for the habitat. It serves as a significant identifying feature at the mouth of China Basin Channel, would be less impacted by new development and affords a valuable recreational and educational resource for the greater San Francisco community. Playfields here would be readily accessible to residents in Mission Bay and citywide.



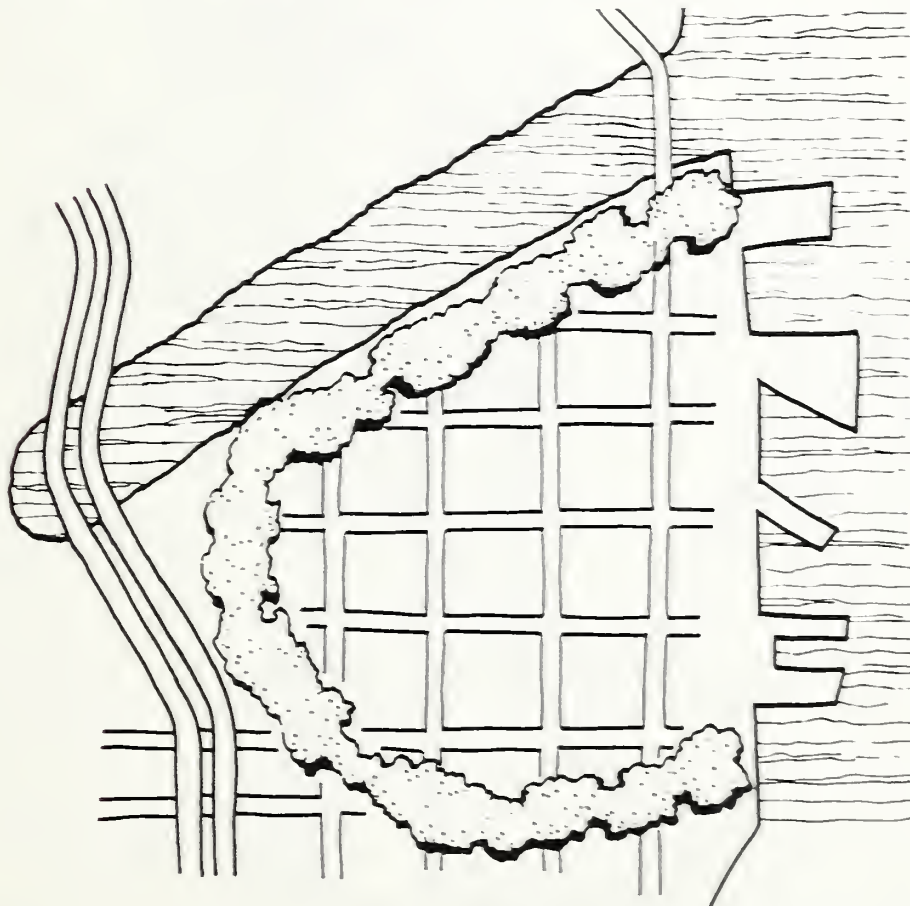
As an alternate scheme, the marsh habitat could be situated almost entirely east of Third Street with maritime uses, eliminating the play fields area. A further option shows the building uses replaced by the play fields.

4.2 Design Concept B

4.2 Design Concept B

4.2.1 General Characteristics

This concept takes its basic pattern from existing Third and Sixteenth Streets, offering a grid orientation south of the Channel roughly the same as that of Potrero Hill. North of the Channel, the South of Market grid could be retained. This concept features a large crescent open space, reminiscent of the shape of the historic Mission Bay which formerly occupied this site. The crescent is formed by the Channel and an open space with a possible waterway extending south parallel to I-280 or Sixth Street and arching up to the Bay's edge. No other San Francisco neighborhood integrates Bay water systems so thoroughly.



Illustrative Plan 3

Mission Bay San Francisco

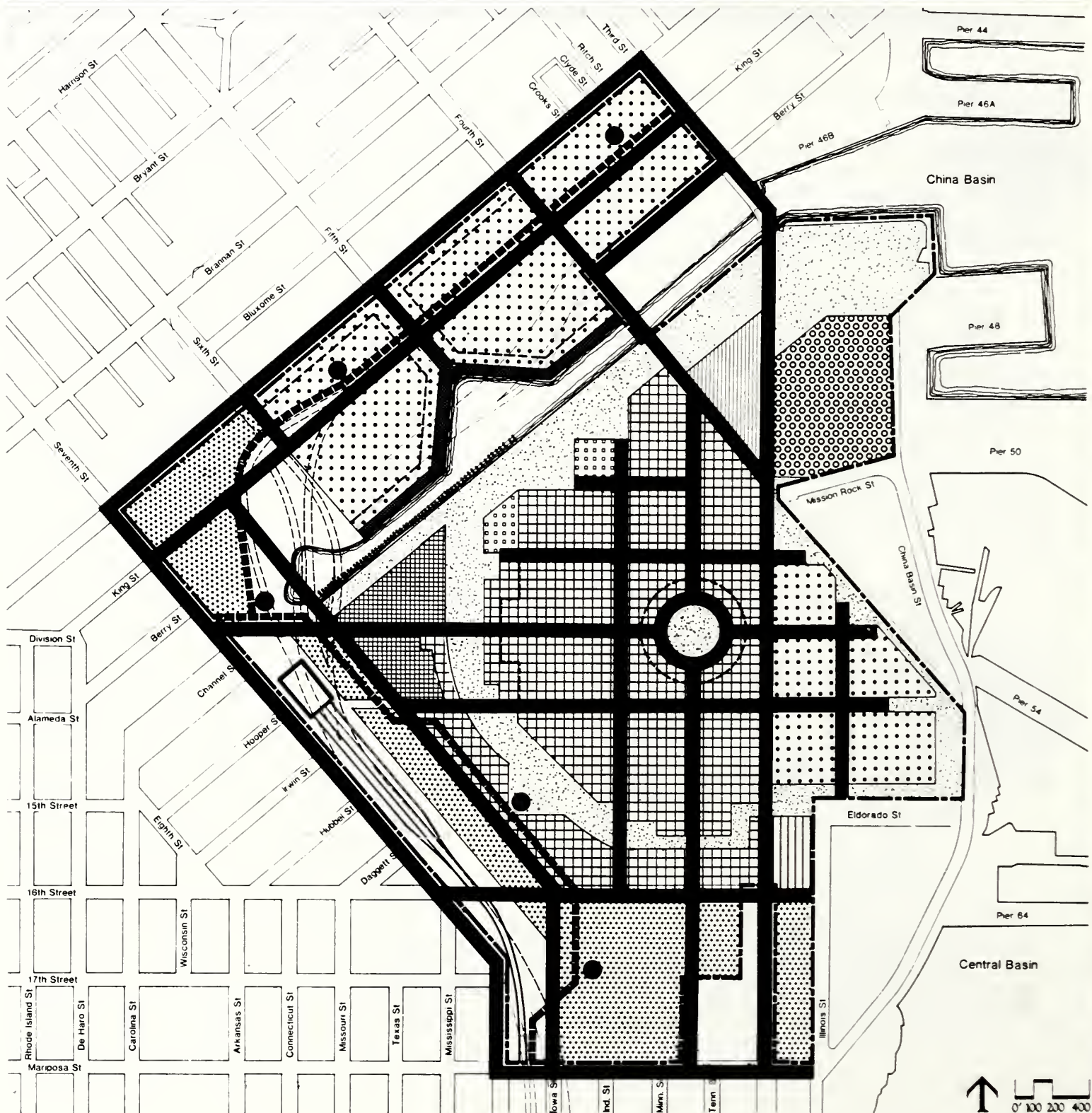
San Francisco

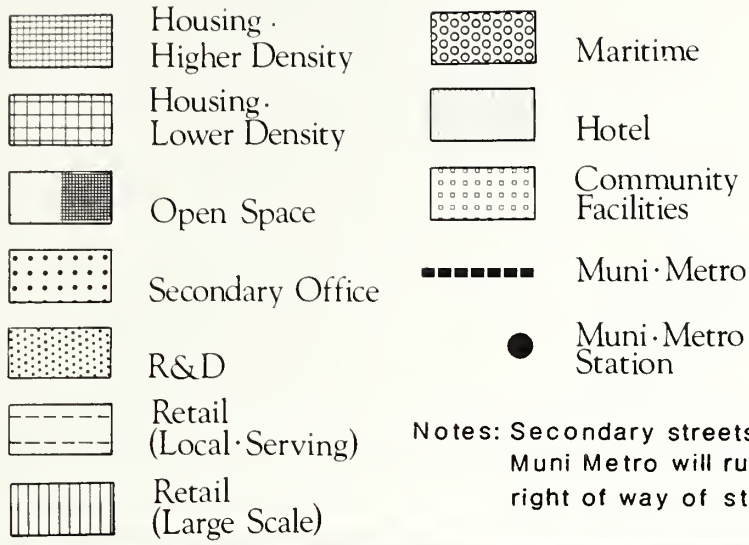
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	Housing - Higher Density		Maritime
	Housing - Lower Density		Hotel
	Open Space		Community Facilities
	Secondary Office		Muni-Metro
	R&D		Muni-Metro Station
	Retail (Local-Serving)	Notes: Secondary streets are not shown. Muni Metro will run within the right of way of streets.	
	Retail (Large Scale)		





Notes: Secondary streets are not shown.
Muni Metro will run within the right of way of streets.

Illustrative Plan 4

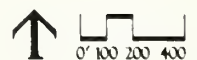
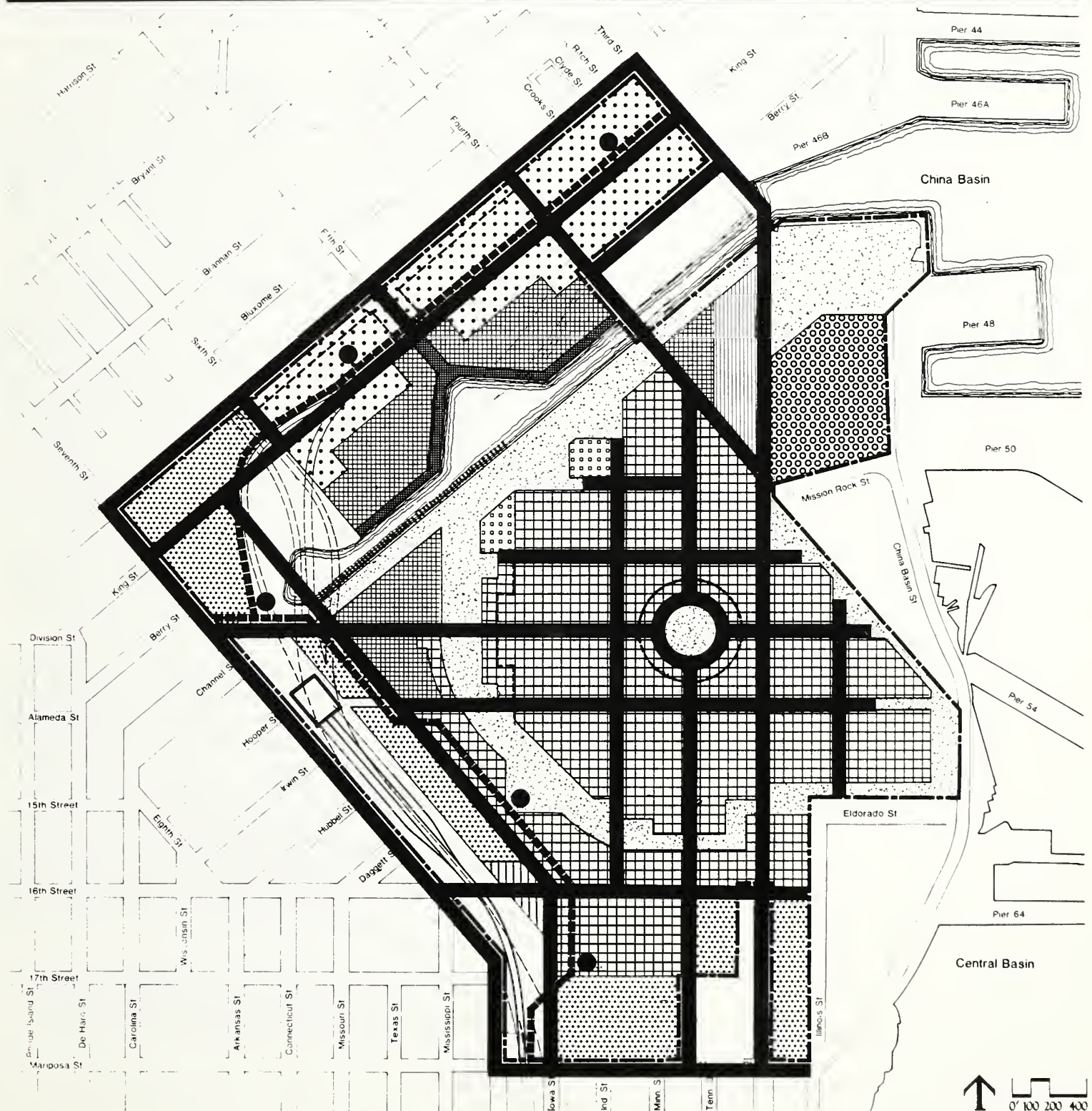
Mission Bay San Francisco

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4.2 Design Concept B

4.2.2 Land Use

Land use north of the Channel could consist of secondary offices between Townsend and King Streets and either more office space or higher density housing next to the Channel. A substantial number of Mission Bay residents could easily enjoy and use the Channel. The proximity of the land north of the Channel to the South of Market and downtown area suggests use of this area for more intensive development.

The lower density residential development, with associated community facilities, would begin south of the Channel. An extension of Division Street could cross into the site next to a relocated Caltrain station and Muni Metro station. This would provide a location for additional office space, or higher density housing if preferred, and carry on easterly with retail uses toward the center of a residential neighborhood. At an angle to the Channel some streets, similar to various Marina district streets, would reach the Channel, providing some residential frontages and view corridors. Additional lower rise residential blocks continue east of Third Street taking advantage of waterway and Bay proximity. Alternatively, offices uses could occupy this area, providing a special office complex next to the Bay. Retail, community and cultural facilities could be planned along the Channel near residences.

Views from the neighborhood streets would be north toward Downtown or east toward the Bay. This grid and neighborhood pattern also would emphasize the very long view east along Sixteenth Street, toward Twin Peaks. It also would result in some north-facing units.

Along I-280, R&D uses on fairly small parcels would buffer the neighborhood, and be oriented inward toward the open space crescent. Retail uses could be developed along a portion of the open space crescent at the intersection with streets, providing a pedestrian-oriented shopping area serving these homes and the central neighborhood.

South of Sixteenth Street is planned for primarily R&D uses, creating the opportunity for campus-like development as a

4.2 Design Concept B

transition from Mission Bay residences to industry to the south. Some housing could occupy this area as well.

Land east of Third Street at the Channel could be developed in part as a wetland habitat. A wetland in this configuration forms the beginning of the open space crescent that encircles the entire site. This location could also be well-used for maritime-related uses, in connection with activities on nearby piers. The parcel south of the Channel and bounded by Third and Fourth Streets would be an excellent location for a hotel which could take advantage of this shoreline site, providing a unique lodging experience for San Francisco visitors.

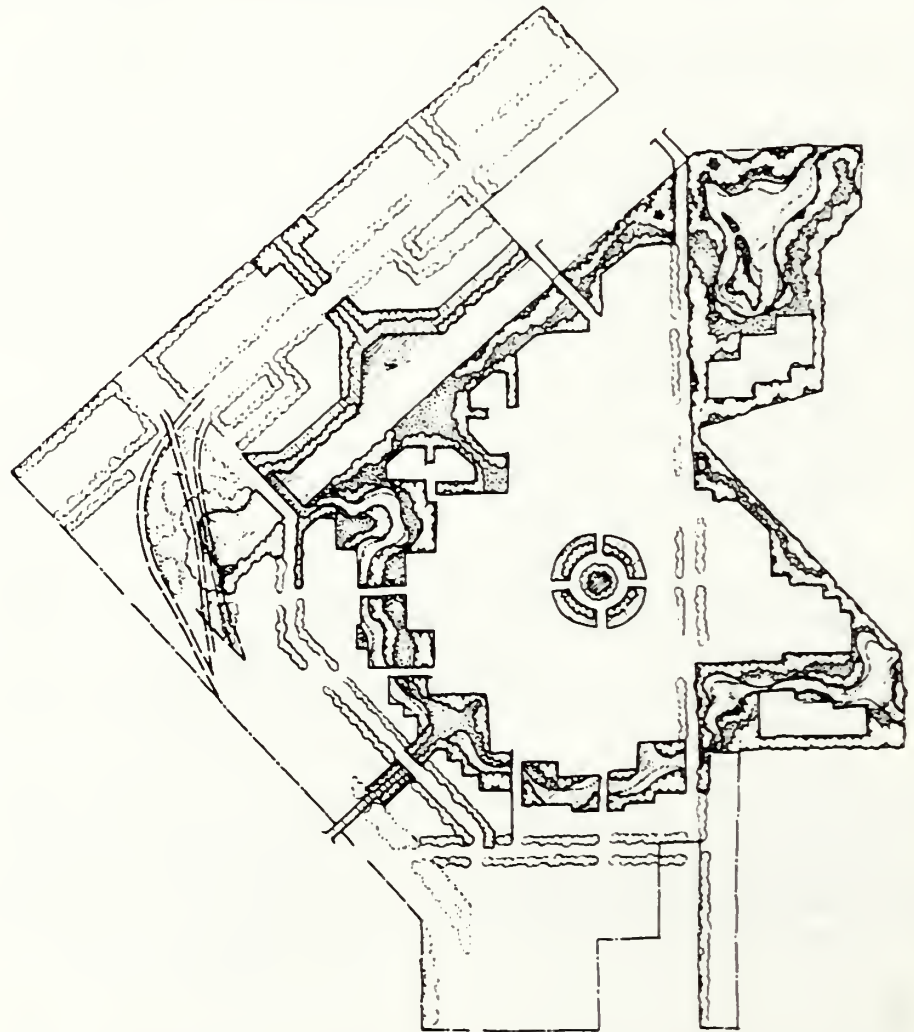
This overall grid pattern would most directly link Mission Bay with neighborhoods to the south by retaining Third Street as a direct traffic and visual corridor toward Downtown. Also, although Sixteenth Street is the only actual link, this plan could reiterate the Potrero Hill grid suggesting kinship with that nearby neighborhood. The concept would enable a direct visual connection with Showplace Square along an extension of Division Street.

By altering the South of Market grid at the Channel, Mission Bay would be made visually different from that area. That distinction would be reinforced by the crescent encircling the residential portion of the site. Thus, the crescent could serve as a major amenity for the site and its surroundings, while distinguishing Mission Bay from those surroundings. A circular park would be at the center of the residential area, with retail uses along its frontage. This could provide both a focal point and open space and retail resource at the heart of the new neighborhood. There is an opportunity to subtly reinforce an association with South of Market, using the axial open space suggested on the alternative Open Space concept. While this concept provides more open space, efficient housing typologies described in Section 2.10 cannot be planned on the affected central blocks.

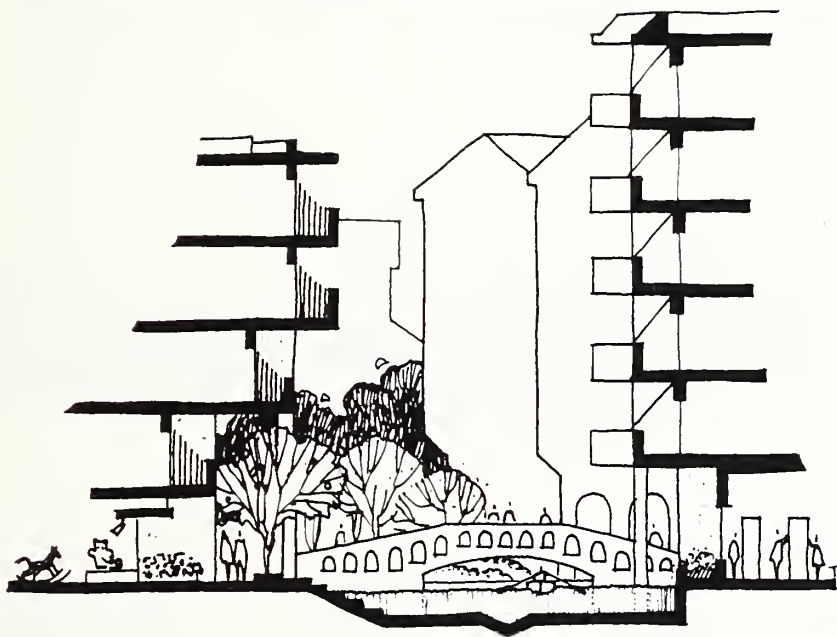
4.2 Design Concept B

4.2.3 Open Space

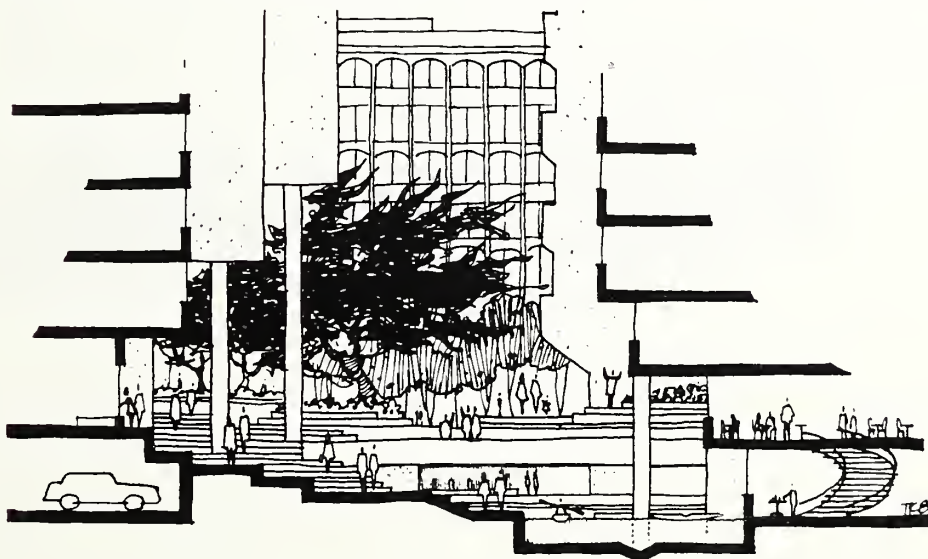
The main open space organizing forms in this concept would be the large crescent embracing the community, with a circular central plaza at the heart of the development. The crescent open space would be defined by a variegated saw-toothed pattern created by the adjacent buildings. Meandering through this crescent park area, a non-tidal water feature could integrate the adjacent residential, retail and community uses with natural and recreational amenities.



4.2 Design Concept B



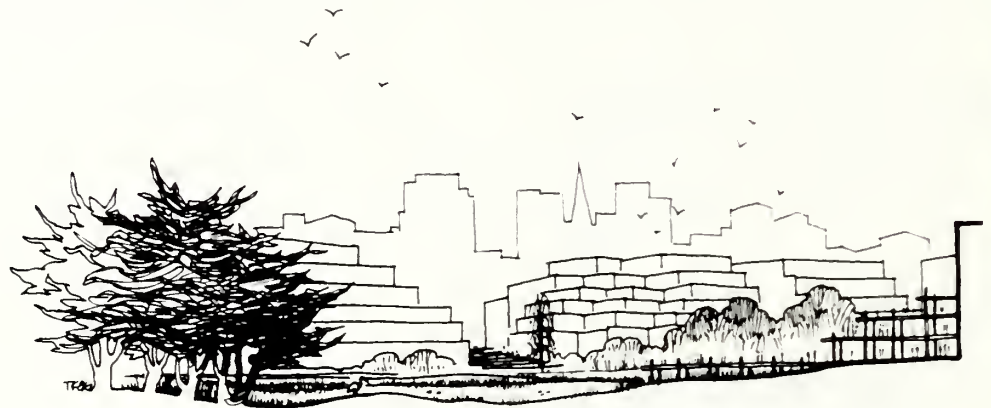
Originating with Bay water near the southern part of Mission Bay, the canal would thread through the crescent providing maximum amount of water and open space frontage to the community and a nearly traffic-free pedestrian spine from the Bay waterfront to China Basin Channel.



4-22 DESIGN CONCEPTS

4.2 Design Concept B

Approaching but still well back from the Channel, the crescent canyon would open to reveal vistas across to the north side, and perhaps beyond to the Downtown skyline.

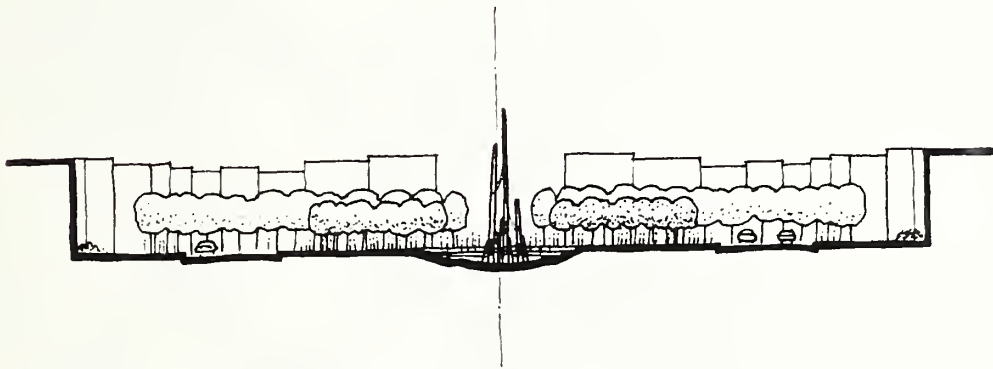


The canal could culminate at the Channel in a water feature which would fall from the new Owens Street bridge over China Basin Channel.



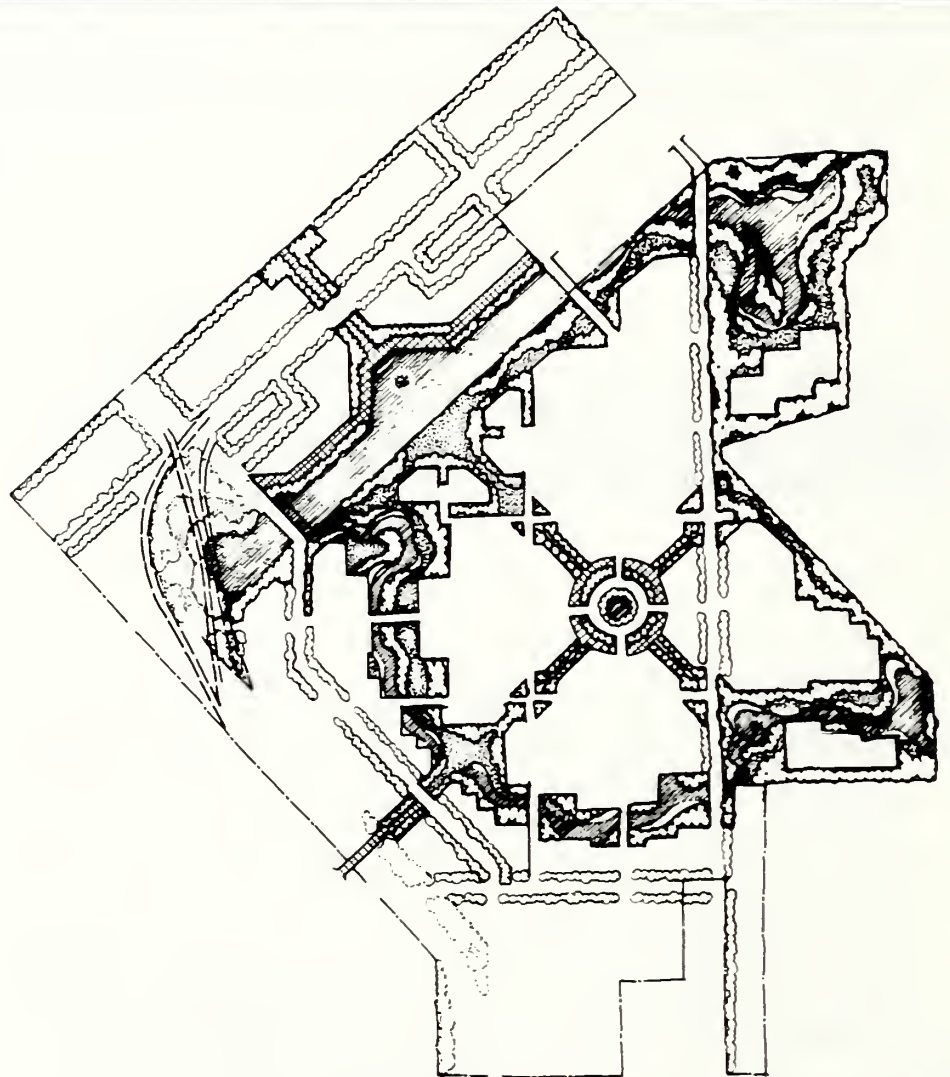
4.2 Design Concept B

Heavily landscaped streets center on a formal grand circle and a possible public plaza. Its arms reach out connecting to the crescent and Potrero Hill to the west, the Bay waterfront to the south and east, and north to China Basin Channel.



Alternatively, the open space system could include a cruciform of pedestrian-only corridors, rather than landscaped streets. This alternative open space concept functions as a complete interconnected network. All housing blocks would have direct visual and physical access to open space amenities. The system would be diverse in its form, scale and use patterns. A high degree of separation could exist between pedestrian and vehicular circulation networks. The system would facilitate easy pedestrian movement between all open space features. This concept would also afford the most extensive distribution of open space amenity throughout the community.

4.2 Design Concept B

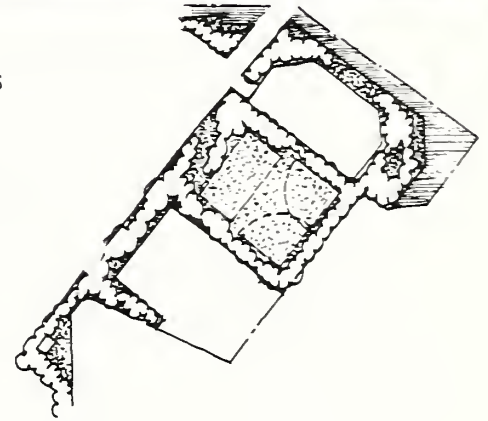


Concept B - Open Space Alternative 2

Because the alternative open space scheme along the crescent does not adhere to the grid pattern of the adjacent streets and buildings, a variety of building shapes occur where the street grid meets the open space network. This would pose both disadvantages and advantages inherent in the design of residential housing units which front onto it. It is a less efficient housing layout, however it provides opportunity for more interest and variation in the architectural configuration.

4.2 Design Concept B

A marsh wetlands habitat could be integrated along China Basin Channel partially between Third and Fourth Streets, as well as east of Third. This affords the benefits of the wetlands park to the community and could be a dramatic gateway for Mission Bay as well as a recreational and educational resource. Further, this system would allow the opportunity for structured active recreation uses east of Third Street in addition to space for maritime operations.

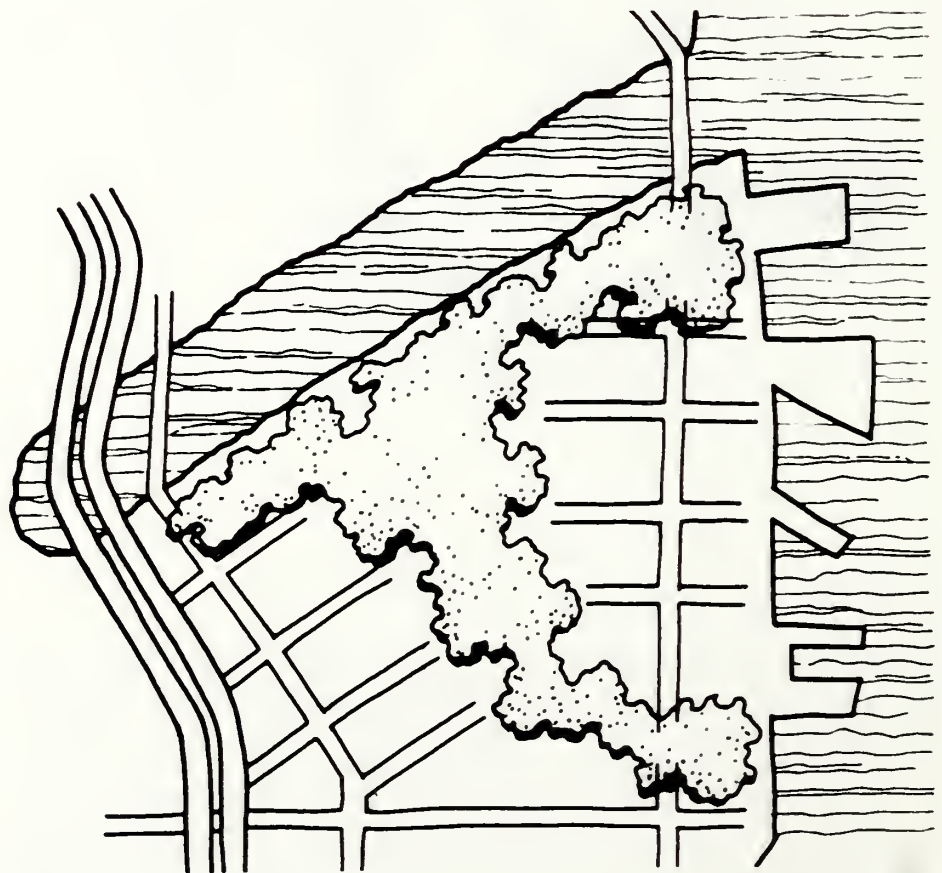


4.3 Design Concept C

4.3 Design Concept C

4.3.1 General Characteristics

This illustrative plan absorbs the several street patterns from the edges of the site to create a mixed grid on the site. The concept would adopt the South of Market grid at the western end of the Channel where the new Sixth/Owens Street bridge is needed. It would also incorporate existing Third Street, and parallel streets to the east. The intersection of the grids near the center of the site can then be resolved either with open space or curvilinear streets, or both.



Illustrative Plan 5

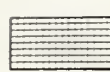
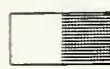
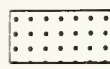
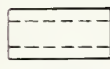
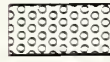
Mission Bay
San Francisco

San Francisco

Department of City Planning

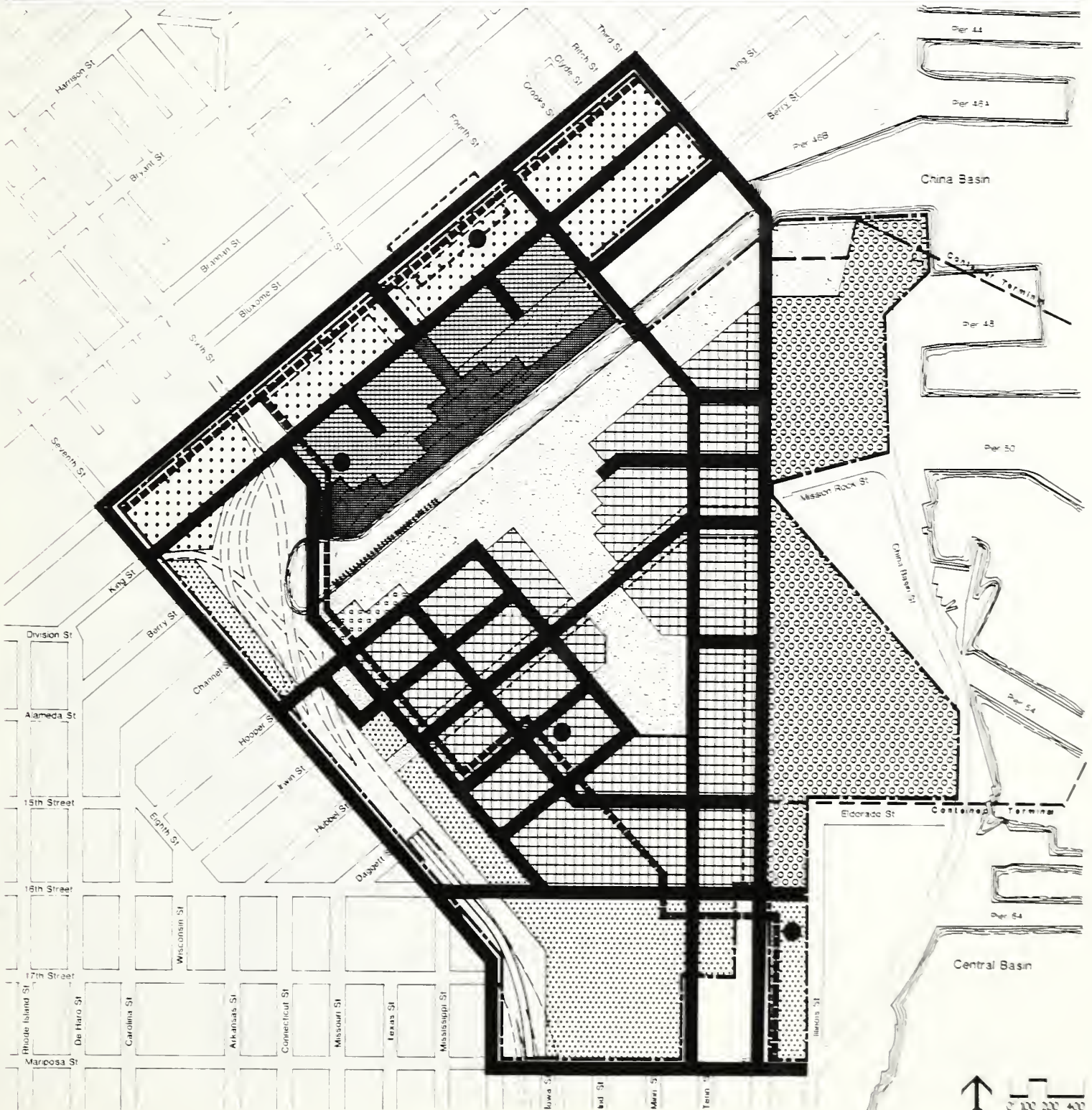
EDAW, Inc.
 ELS Ellipsanti & Logan Architects
 Danadriev & Koenig Associates
 Daniel Solomon and Associates
 Gabriel-Roché, Inc.

KeanHenric Architects
 Carl Antrim & Associates
 Robert L. Harman
 Philip Williams & Associates
 McGuire & Company

-  Housing - Higher Density
-  Housing - Lower Density
-  Open Space
-  Secondary Office
-  R&D
-  Retail (Local-Serving)
-  Maritime

-  Community Facilities
-  Muni-Metro
-  Muni-Metro Station

Notes: Secondary streets are not shown.
 Muni Metro will run within the
 right of way of streets.



Illustrative Plan 6

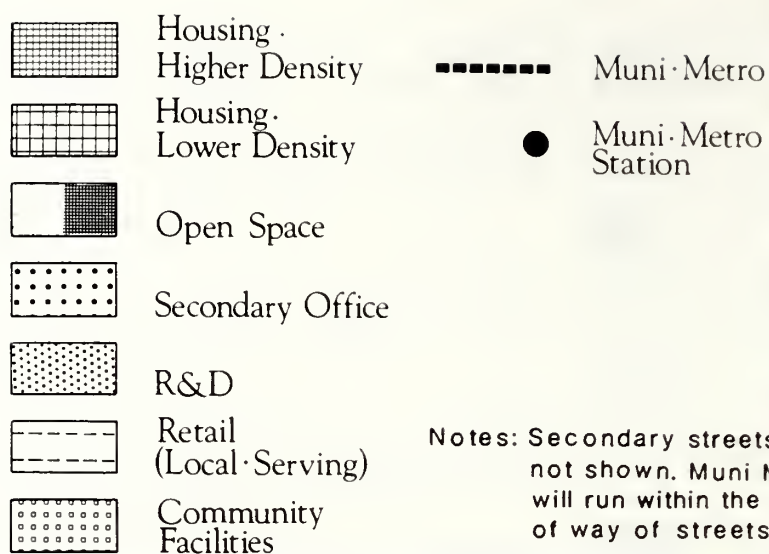
Mission Bay San Francisco

San Francisco

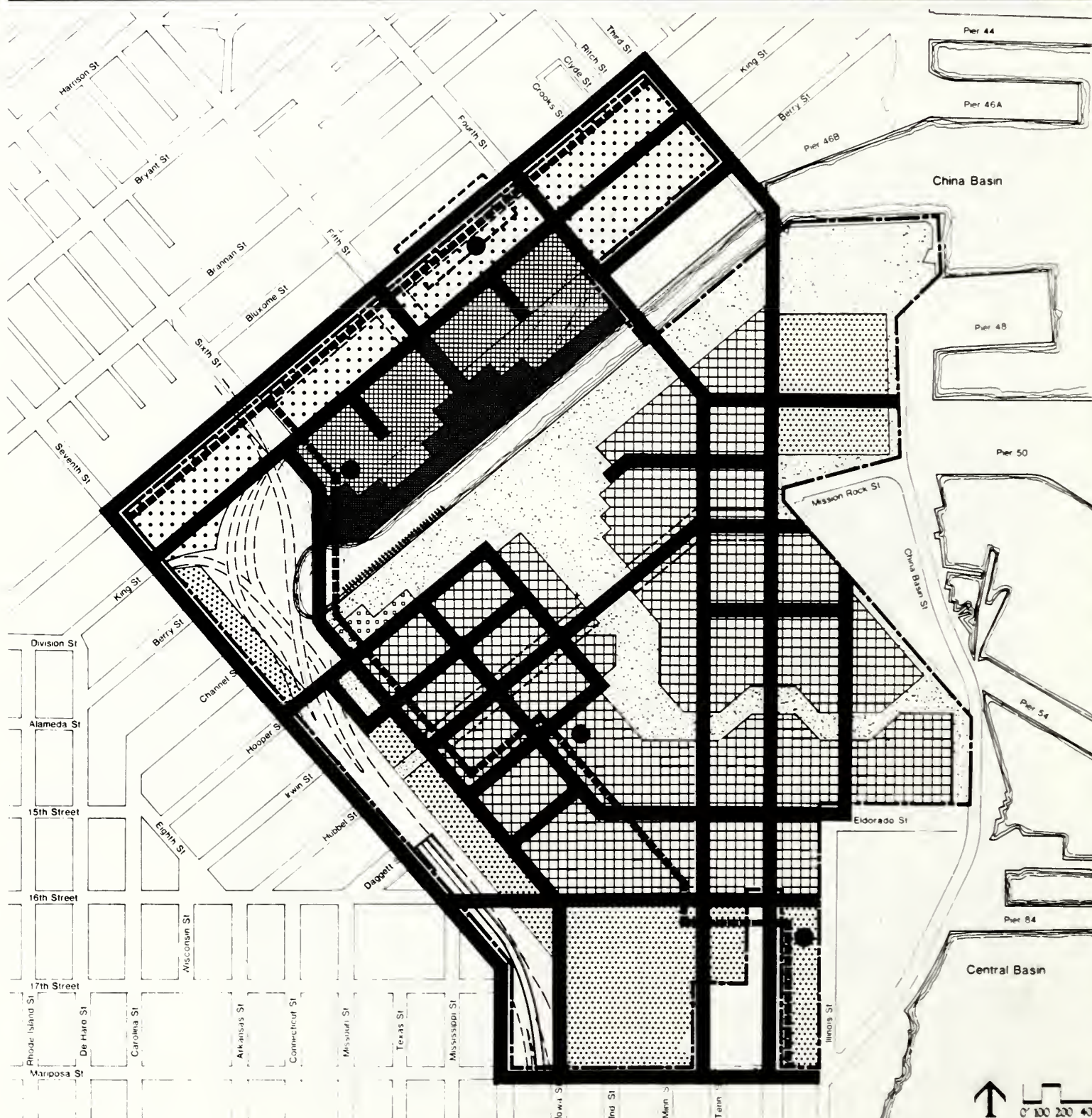
Department of City Planning

EDAW Inc.
E.L.S. Elbasani & Logan Architects
Damadjeva & Koenig Associates
Daniel Solomon and Associates
Gabriel-Roche, Inc.

KwanHenri Architects
Carl Anthony & Associates
Robert L. Harrison
Philip Williams & Associates
McGuire & Company



Notes: Secondary streets are not shown. Muni Metro will run within the right of way of streets.



4.3 Design Concept C

4.3.2 Land Use

As Columbus Avenue or Market Street illustrate, the intersection of non-parallel grids creates both an opportunity for exciting urban places and a difficult transition from functional and economic standpoints. The earlier Southern Pacific Land Development Company plan for this site provided one means of integrating the several grids with an island. Mission Creek Conservancy and San Francisco Tomorrow concepts suggested a major open space, the former emphasizing wetlands, and the latter a green park space. Another solution is suggested by this concept. Significant open space amenities would originate at the Channel and move south through the center of the site, then continuing eastward to the Bay. Multiple, variously-shaped open space areas could be created at the grid intersections. The central open space would become the focus of views from neighborhood streets since long visual corridors would not extend through the site. Except for Third Street, these corridors are eliminated by the foreshortened grids, creating an inward-focussed development. A retail street including community services and cultural facilities would cross this open space, giving residents another neighborhood focal point.

North of the Channel, secondary office uses would occupy land on Townsend Street, with higher-density housing along King Street and the Channel's edge. Retail, entertainment and cultural facilities could be included in this area. In the Channel, a wildlife environment could be provided as an amenity for Channel residents. This environment, while too small to qualify as a bona fide marsh habitat, would represent an improvement of existing wildlife value in the Channel. Some prime residential land south of the Channel would be consumed in resolving the grid conflict. However, this area could be a highly-utilized public open space, especially by nearby Mission Bay residents.

Housing would extend west to an Owens Street alignment of Sixth Street. The R&D buffer along I-280 would then protect residences from the adverse effects of I-280. R&D uses, perhaps in a campus-like plan, would be provided south of

4.3 Design Concept C

Sixteenth Street, in order to integrate Mission Bay with industry to the south.

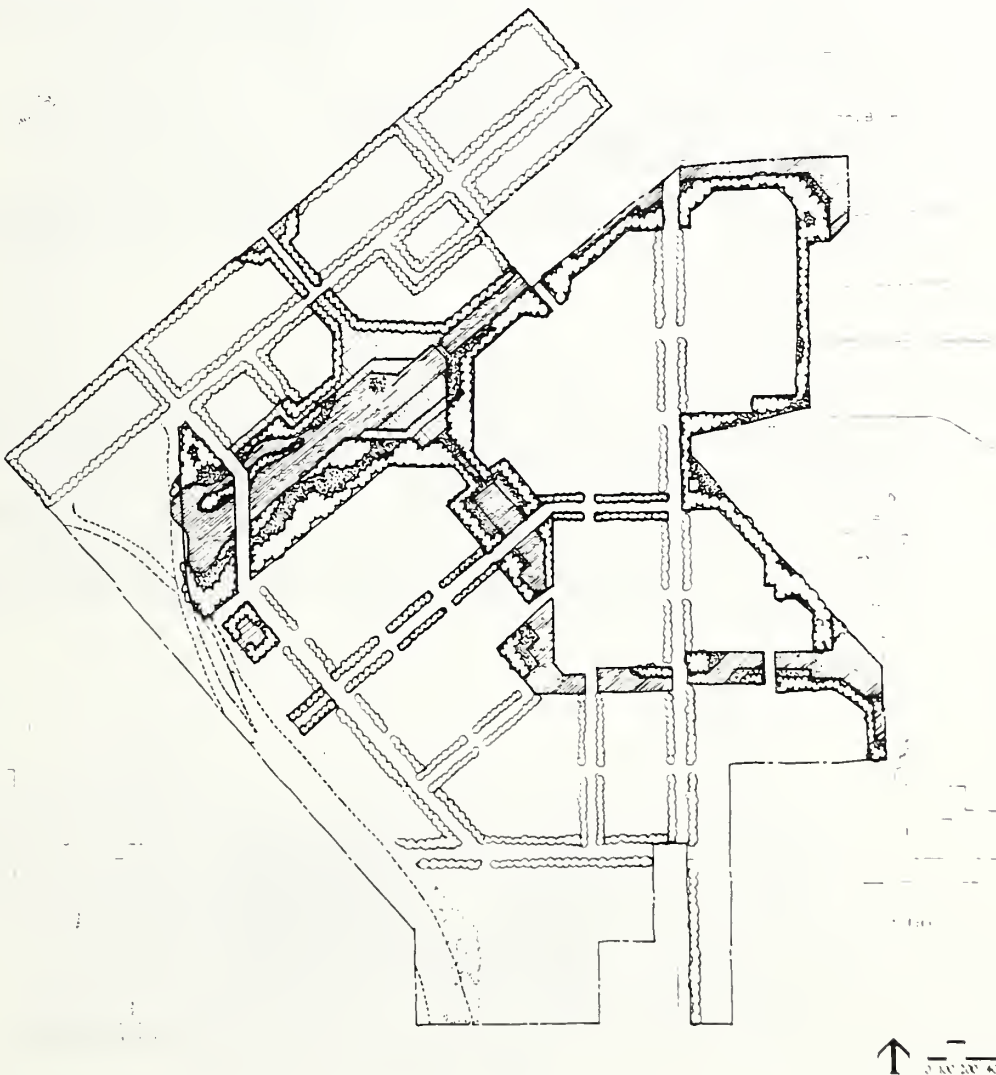
The northeast corner of the site could be developed for maritime or as R&D if a wildlife environment is provided in the Channel itself. Playfields could be provided here as well.

Concept C west of Third Street would be oriented west or inward toward the central open space. This concept is compatible with either more housing to the east, or implementation of the proposed container terminal utilizing all land adjacent to this site yet east of Third Street. Uses on the western frontage of Third Street should include retail uses as a buffer for Mission Bay housing if the container terminal is developed. With such a terminal, the open space system would not extend across Third Street to the Bay's edge as Illustrative Plan 5 suggests.

4.3 Design Concept C

4.3.3 Open Space

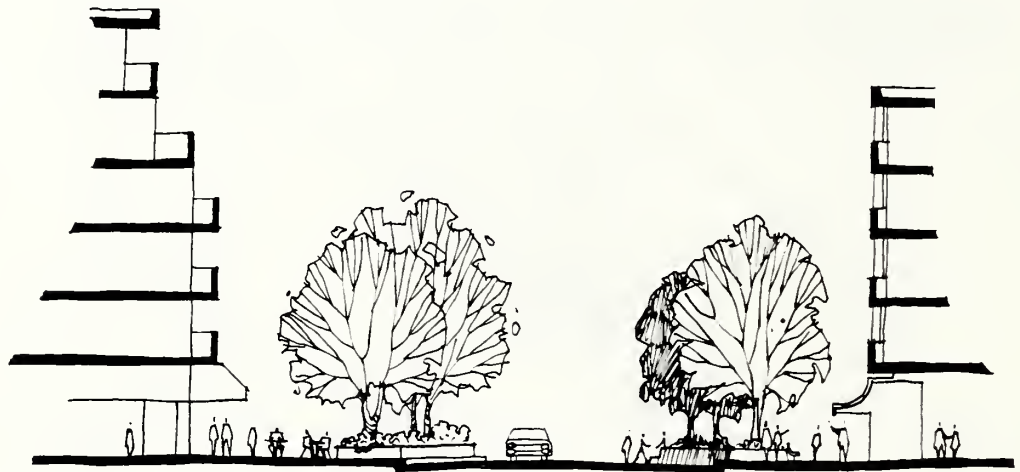
This concept would resolve the conflicting South-of-Market grid and Third Street grid confrontation, with the open space system, in a functional, playful and enticing way. The central open space area begins where the extended Fifth Street axis meets the Channel. From there, it would jog and meander through a series of hard-edged urban spaces, each one suggesting the next, to the Bay waterfront. This open space area could include a canal.



4.3 Design Concept C

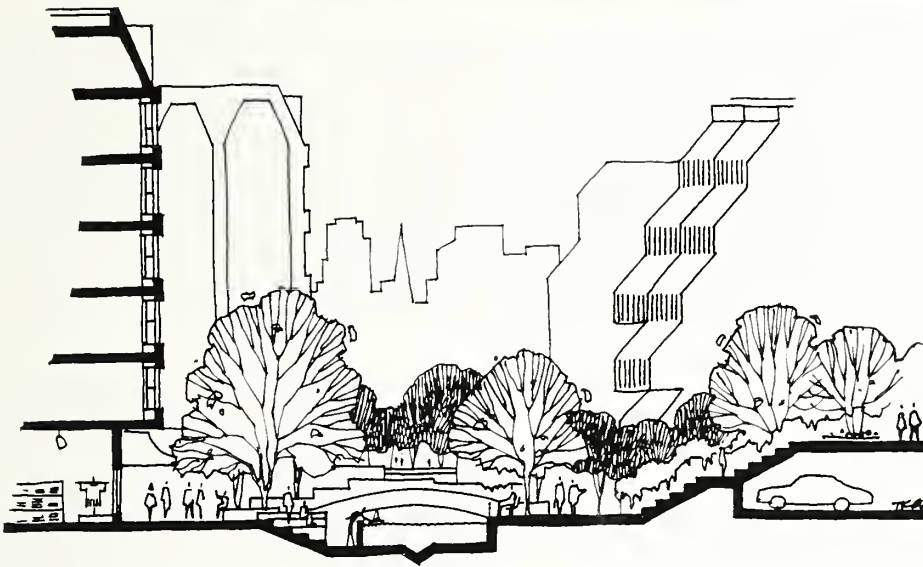
A non-tidal, contained waterway through this central system could provide continuity throughout and a water theme. The water would flow from the Bay north to the Channel. A movable pedestrian bridge could cross the Channel to continue the connection north to South of Market and toward downtown San Francisco.

Completing the basic open space structure, a secondary corridor would cross the main spine, connecting the Metro station, to the west, through the residential community to the central spine, Third Street and the Bay waterfront beyond.

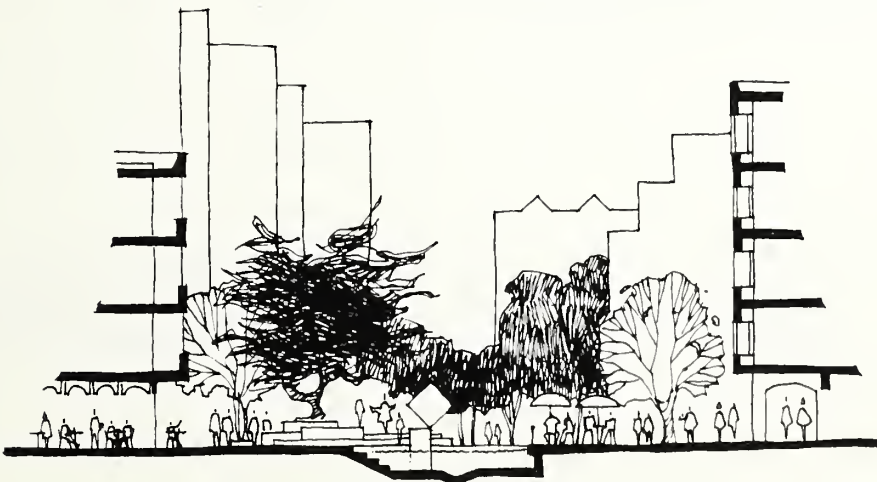


This corridor would combine a street, linear pedestrian open space treatment and neighborhood retail facilities at the street level. Commercial uses would be possible along the central spine, fronting onto the canal spaces where appropriate.

4.3 Design Concept C

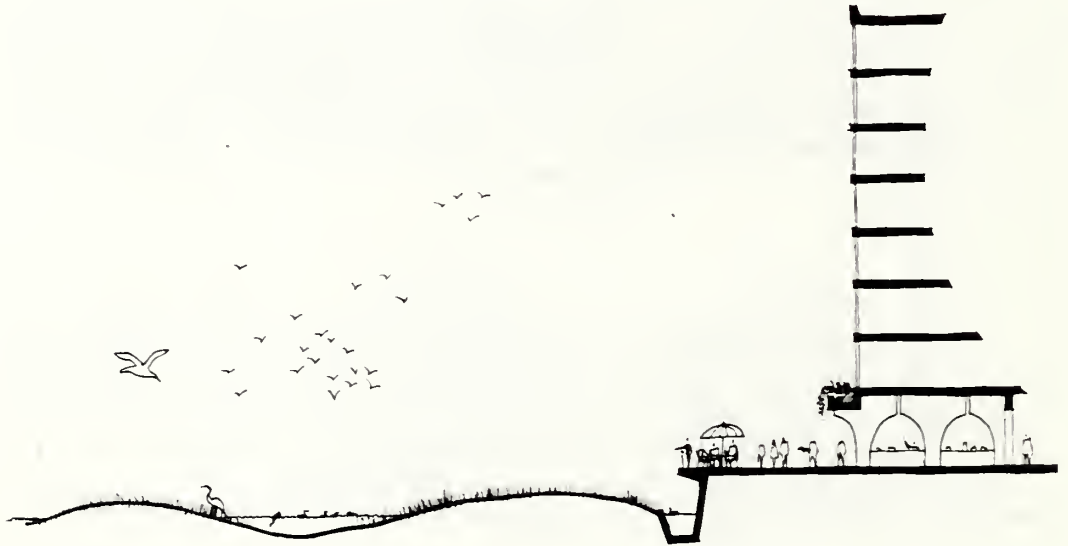


The junction of the central spine and Channel would form the main focus of the Open Space System. Through a water event, the canal could empty into the Channel. A water spire near the north side of the Channel could provide a major centerpiece, visually relating both banks.



4.3 Design Concept C

Recreational open space amenities would be largely unstructured. Structured playfields could be provided on the northeastly parcel, as indicated on the accompanying partial plan or the alternate scheme. To help facilitate this change, Concept C does not include a wetland habitat per se, with its full-cycle food chain, nesting/breeding capabilities and large space requirements. It does include a smaller marsh off the north edge of China Basin Channel from midway between Fifth and Sixth Streets to west of Sixth Street.



Combining island and open water (the Channel), it would constitute a marked improvement over the existing tideland conditions and would better serve the existing bird community.

4.4 Associated Land Use Accounts

4.4 Associated Land Use Accounts

As indicated earlier, the concepts and illustrative land use plans were developed with existing conditions, objectives and policies, plan determinants and varying programmatic parameters in mind. The following table summarizes the resultant land accounts for each illustrative land use plan. The plans were developed and the resultant land uses were calculated to measure each concept against the desired program ranges. Some adjustments in the land use plans were then made to establish clear the program alternatives.

As noted previously, there are still variables in each concept. For example, the height and density of housing can be changed on housing blocks. Further adjustments can be made as long as (a) exchanges of acreage between land use categories still result in a realistic land use plan that meets multiple Mission Bay objectives and policies, and (b) viable new locations for new land uses can be located.

The reason for extracting these land use accounts is to compare land use efficiency and illustrate the trade-offs that specific land use plans would necessitate in terms of acreage for each use. Land use efficiency and land use mix must be weighed along with design character and planning concepts during evaluation of these plans.

4-36 DESIGN CONCEPTS

4.4 Associated Land Use Accounts

Illustrative Plan 1 Land Use	Design Concept A 1	Design Concept B 2	Design Concept B 3	Design Concept C 4	Design Concept C 5	Design Concept C 6
HOUSING:						
Total DU	10,229	7,467	5,076	8,228	6,256	7,540
Ac	126.3	97.0	69.8	107.6	89.2	110.6
DU/Ac A	81	77	73	77	71	68
Higher density DU	3,913	1,998	1,103	3,065	1,893	1,893
Ac	32.0	15.2	8.3	22.4	15.6	15.6
DU/Ac A	122	131	143	137	121	121
Medium density DU	5,448	4,595	3,093	5,853	3,313	4,051
Ac	71.7	61.8	40.7	50.7	43.6	53.3
DU/Ac A	76	76	76	76	76	76
Lower density DU	502	502	604	1,124	974	1,420
Ac	13.2	13.2	15.5	29.6	25.6	37.3
DU/Ac A	38	38	38	38	38	38
Over Retail DU	376	272	196	196	176	176
Ac	9.4	6.8	4.9	4.9	4.4	4.4
DU/Ac	40	40	40	40	40	40
OPEN SPACE:						
Total Ac	79.1	64.5	79.7	72.8	59.2	74.0
Assoc. with other uses	8.9	14.3	16.9	15.7	13.6	16.1
OFFICE:						
Sq.ft. (FAR 4.0)	1,742,400	4,221,200	2,857,500	3,554,500	4,146,900	4,146,900
Ac.	10	24.8	16.4	20.4	23.8	23.8
Sq.ft. (FAR 2.35)	0	0	2,897,000	0	0	0
Ac.	0	0	28.3	0	0	0
Total Sq.ft.	1,742,400	4,221,200	5,754,500	3,554,500	4,146,900	4,146,900
Total Ac	10	24.8	44.7	20.4	23.8	23.8
0 1 B:						
Sq.ft. (FAR 1.75)	204,900	2,126,800	2,529,900	2,025,300	2,004,800	2,858,600
Ac.	4.0	27.9	34.5	26.7	26.3	37.5
MARITIME:						
Sq.ft. (FAR 0.5)	0	0	217,800	217,600	962,700	0
Ac.	0	0	10	10	44.2	0
RETAIL:						
lg. Scale S.f. (FAR 0.5)	74,100	91,500	39,200	0	0	0
lg. Scale Ac.	3.4	4.2	1.8	0	0	0
Other Sq.ft. (FAR 0.5)	217,800	242,900	226,500	189,500	156,800	156,800
Other Ac.	10	11.2	10.4	8.7	7.2	7.2
R I B/ SERVICE/ INDUSTRIAL:						
Sq.ft. (FAR 1.75)	670,800	0	0	0	0	0
Ac.	8.8	0	0	0	0	0
WHOLESALE/ SHOWROOM:						
Sq.ft. (FAR 3.0)	1,542,000	744,900	0	0	0	0
Ac.	11.8	5.7	0	0	0	0
HOTEL (Ac)	0	0	4	3.5	0	0
COMMUNITY FACILITY (Ac)	3	3	2	2	1.2	1.2
SERVICE/ INDUSTRIAL (Ac)	0	0	0	0	0	0
SUBTOTAL (Ac)	238.1	237.2	233.1	233.1	233.1	233.0
MISCELLANEOUS (Ac)	21.5	21.5	20.7	20.7	24.0	24.0
INFRASTRUCTURE (Ac)	25.4	36.3	41.2	41.2	37.9	37.2
TOTAL (Ac)	295	295	295	295	295	295

NOTES:

A. Open Space associated with other land uses includes:
 5% of housing acreage (excluding hsq. over retail)
 13% of 0 1 B acreage
 25% of office acreage

B. FAR values apply to Planning Team Concepts only.

C. Infrastructure acreage shown has not been measured from plans.
 Figure shown is Total project site (295 Ac) less Subtotal and Miscellaneous.

D. EIR Alternatives include an additional 27 Ac east of Third St. that are not a part of the Planning Team Concepts total acreage.

A. Dwelling units per acre (DU/Ac) has been rounded to the nearest whole number.

A. Housing density on Planning Team Concepts reflects 5% of acreage dedicated to public O.S.

Appendix

THE SALINE AND BRACKISH WATER WETLANDS
OF
SAN FRANCISCO BAY

A summary of a paper given at the Western Society of Naturalists
63rd Annual Meeting

December 27, 1983

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Tiburon Center for Environmental Studies
San Francisco State University
PO Box 855
Tiburon, Ca 94920

INTRODUCTION

The wetlands of San Francisco Bay, San Pablo Bay, and Suisun Bay are the largest, most diverse system of marsh lands in California. Prior to 1850, tidal wetlands covered 800 km² and presently encompass 125 km² of which 75 km² are of recent origin due to increased sedimentation in the Bay. Diked wetlands which retain wetland characteristics cover 66 km². The purpose of this paper is to review the physical and biological setting of the saline and brackish water tidal wetlands in San Francisco Bay, to summarize the perceived ecological and societal values given for Bay wetlands, and to mention possible restoration goals. Support for this review is provided by the US Fish and Wildlife Service to MNJ. The information given below will be published in greater detail in a community profile of San Francisco Bay wetlands planned for publication in late 1983.

PHYSICAL SETTING

We know very little about the original appearance of saline and brackish water tidal wetlands around San Francisco Bay except what we can infer from early descriptions by European explorers. However, based on geologic evidence we know the Bay has undergone tremendous changes which have had an effect on the development of wetlands. Approximately 10,000 years ago, the Bay did not exist as the shoreline of the Pacific Ocean was located outside of the Golden Gate. Sea level began rising rapidly about 9 to 7,000 years before present, filling the river valley which was then San Francisco Bay. The sediment record shows that the former river channel was filled with land derived sediments approximately 6,000 years ago and that the relatively flat upper portions of the river valley were flooded. This is the most likely date for

in the Spartina zone. The introduced isopod, Sphaeroma quoyanum, has been responsible for increased bank erosion along the bayward edge of salt marshes by weakening the clay substrate through extensive burrowing activity. Few cases of competition between introduced and native fauna have been documented. The most notable study has been one completed by Dr. Margaret Race on the native species of mudsnail, Cerithidea and the introduced species, Ilyanassa. The native species has been displaced from most of its range and now exists in isolated high marsh pannes.

One group of invertebrates that has been well studied in Bay marshes are the insects. Over 200 species have been identified and abundances determined. Spiders are a dominant predator in this system.

Fish communities in marshes are dominated by a few species, notably the topsmelt, Atherinops affinis, the arrow goby, Clevelandia ios, the staghorn sculpin, Leptocottus armatus, and the three spined stickleback, Gasterosteus aculeatus. Few species of economic importance are found in abundance within saltmarsh creeks, however, juvenile striped bass, starry flounder, and leopard sharks are caught frequently. Sampling within saltmarsh creeks indicate significant variation from month to month although there appears to be some seasonality for individual species. Greatest overall abundance occurs during summer months.

Bird useage of marsh habitats is greatest during the fall and spring migration periods. Their primary feeding grounds are located on the adjacent mudflats. They do feed within the marsh during high tide and utilize the protection provided by the vegetation during storms. Only a few species utilize the marsh as a breeding area, however; they include several endangered species such as the California clapper rail and the black rail.

While descriptive studies abound concerning salt and brackish marshes, little work has been done to decribe community dynamics within wetlands. Most of the work has focused on primary productivity. Even these studies are limited in that they report production based on max-min values. The range given for Spartina foliosa is 400 to 1400 g dry wt/m²/yr and for Salicornia virginica as 600 to 1400 g dry wt/m²/yr. Only one study has evaluated the concept of outwelling of organic matter from salt marshes into the Bay (based on ¹³C/¹²C data) and concluded that the contribution of particulate organic carbon (POC) was insignificant compared to other sources of POC. An alternative hypothesis is that most export occurs only during a few days each year when extreme high tides coupled with storm events flush large quantities of organic matter from the marsh. Nutrient exchange rates indicate that the marsh mudflats may act as a net importer of nitrogen.

Conclusions on the ultimate fate of tidal wetland production require more detailed studies on benthic invertebrates. Currently, some estuarine biologists have hypothesized that ben-

thic filter feeders may limit the biomass of phytoplankton in the overlying water. Likewise, it is possible that these invertebrates are also consuming particulate matter derived from the decomposition of marsh plants. At higher elevations in the marsh, the abundant amphipods may be the primary organisms benefiting from high marsh production. Bird predation studies in marsh habitats have been inconclusive to date, but suggest birds can remove significant quantities of invertebrates.

PERCEIVED ECOLOGICAL OR SOCIETAL VALUES OF SAN FRANCISCO BAY WETLANDS

Despite a distinct lack of scientific evidence concerning Bay wetlands, numerous values have been placed on them (Table 1). Most reports give generalizations from east coast marshes to support perceived values while a few give precise cost/benefit ratio analyses and set dollar values to an acre of marsh. Because so many concurrent changes have occurred in the Bay itself, we cannot properly determine the effect of the massive wetland destruction on Bay functioning. It is apparent that much remains to be done to study community metabolism in these systems before sound conclusions can be reached on the importance of wetlands.

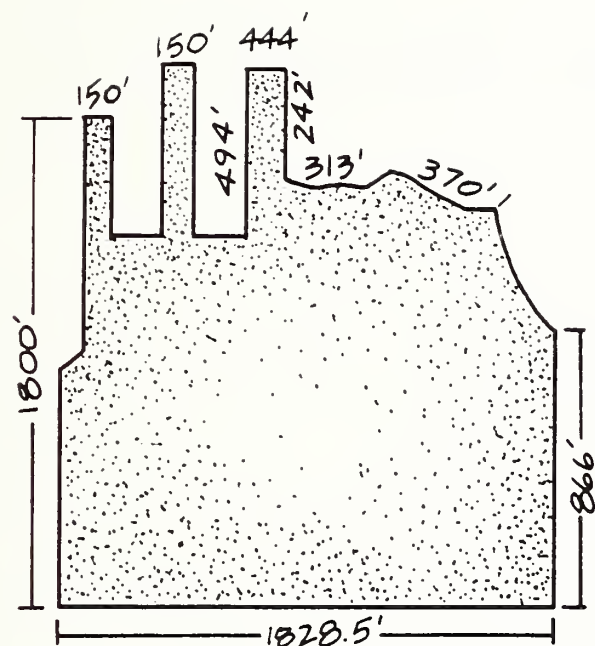
RESTORATION GOALS

Wetland restoration has become a significant activity in San Francisco Bay in the last decade and approximately 2100 acres have been returned to tidal action. The Bay Conservation and Development Commission recently outlined the habitats they felt should be created through mitigation and enhancement: salt marsh, brackish marsh, and freshwater marsh with emphasis on the latter two. Habitat diversity is a primary objective as well to provide optimal habitat to a variety of endangered species. It is a reflection of our limited ecological information that restoration goals remain so general.

Perceived ecological or societal values
of San Francisco wetlands

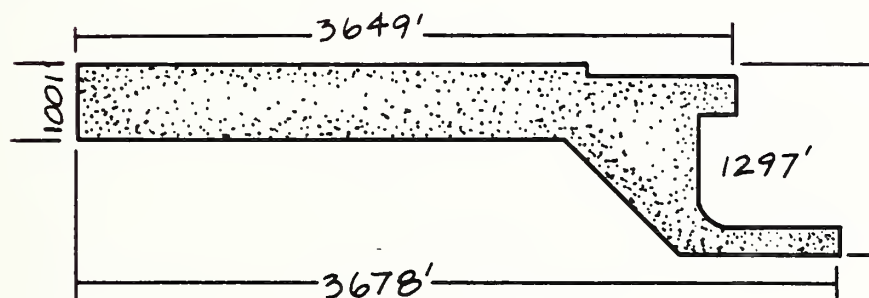
<u>Value</u>	<u>Evidence in support of value</u>
Storm and flood protection	Diked wetlands in south Bay used for stormwater runoff and storage
Dredge spoil stabilization	Several projects of moderate success Extremely slow vegetative spread.
Erosion control	Not effective along most Bay shore- lines without additional physical protection.
Removal of nutrients, pollutants, and toxic wastes	Evidence, where available, contra- dictory or exhibits seasonal variability
Contributions to estuarine detrital food web	Available evidence does not show significant contribution
Value as unique habitat	Strong support by environmental groups to preserve and increase wet- land habitats. Endangered species use
Nursery habitat for fish	Abundant juvenile fish caught in marsh channels; however, not correlated to open Bay habitat.

Comparative Sizes of San Francisco Open Spaces



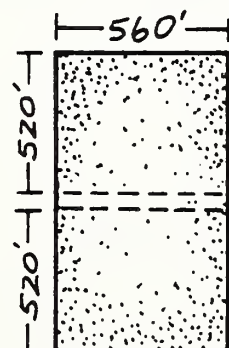
Fort Mason **74 ac.**

Van Ness/Bay/Laguna/water
GGNRA



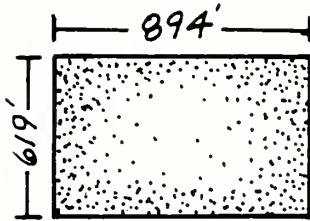
Marina Green **21 ac.**

AB 900
Rec & Park



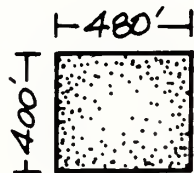
Mission Dolores Park **17.7 ac.**

18th Street/Dolores
Rec & Park



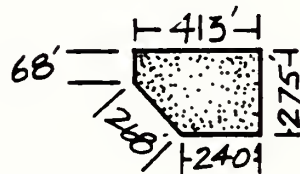
Alamo Square, Lafayette Park 13.5 ac.

Hayes/Steiner
Rec & Park



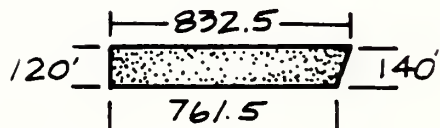
Jackson Playground 5.4 ac.

17th Street/Carolina
Rec & Park



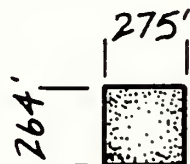
Washington Square 3.1 ac.

Columbus/Union
Rec & Park



Precita Park 3 ac.

Precita/Folsom
Rec & Park



Sidney Walton Park 2 ac.

Front/Jackson
Private



South Park 1.2 ac.

64 South Park Ave.
Rec & Park

Alameda Park 13.5 ac.

5.4 ac.

3.2 ac.

2 ac.

San Jose Park 2 ac.

San Jose
Park

South Park 1.2 ac.

54 South Park Ave.
San Jose Park

